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Gingival reparative granulomas in children

■ *S. Miles Standish,* D.D.S., M.S., and William G. Shafer,† D.D.S., M.S., Indianapolis*

Focal, granulomatous lesions of the gingivae are a rather common clinical problem in any large group of dental patients. They may be sudden in onset, frightening in rate of growth and recur unexpectedly after their removal.

The traditionally accepted relationship of certain of these lesions, specifically pyogenic granuloma and peripheral giant cell reparative granuloma, to trauma, hormonal influence and low grade infection would suggest a comparatively high incidence in children. However, such was not found in the definitive report by Kerr[1] of 289 cases of pyogenic granuloma, there being instead a fairly equal distribution at the various age levels. A similar age distribution pattern was observed for the peripheral giant cell reparative granuloma by Bernier and Cahn[2] and Brown and coworkers,[3] although Phillips and Shafer[4] have suggested a somewhat higher incidence in the younger age groups. However, no studies of these lesions with specific reference to their occurrence in children have been found in the pedodontic literature or the available pedodontic textbooks. For this reason, a series of cases of pyogenic granulomas and peripheral giant cell reparative granulomas in children up to 15 years of age have been reviewed and studied to clarify their age and sex distribution, duration, location, relation to trauma, and histologic features.

■ *Materials and Methods*

The cases of pyogenic granuloma and peripheral giant cell reparative granuloma reported in this series represent routine biopsy and surgical specimens taken from the files of the department of oral pathology, Indiana University School of Dentistry, during the period of October, 1951 through June, 1960. The total available specimens numbered approximately 7,470. Cases selected for study were restricted to children arbitrarily designated as 15 years of age or under, and all cases so recorded in the files were reviewed and the histologic diagnosis confirmed.

All available histories were recorded with regard to sex, age and race of the patient, location of the lesion and other pertinent information. Histologic features were evaluated and observations made concerning variants in each group.

■ *Results and Discussion*

INCIDENCE—One hundred and ninety-one specimens were classified as pyogenic granuloma, of which 30 (15 per cent) were known to occur in children. Seventy-two specimens were classified as peripheral giant cell reparative granuloma, of which 14 (19 per cent) were known to occur in children. These figures are cited to indicate the comparative frequency with which the two conditions were encountered in this laboratory.

SEX—Both the pyogenic granuloma and the peripheral giant cell reparative granuloma were distributed equally between boys and girls (Fig. 1). Of the 30 pyogenic granulomas reported here, 13 occurred in boys and 17 occurred in girls. A similar pattern was observed for the giant cell lesions, 6 being reported in boys and 8 in girls.

RACE—Four cases of pyogenic granuloma occurred in Negro children, 25 were in Caucasian children and in 1 case the race was not recorded. Of the giant cell lesions, 2 were in Negro and 12 in Caucasian children. These figures cannot be considered significant since the biopsy specimens were received from private practitioners as well as the dental school surgery clinics.

AGE—Although all the cases included in this study were from children 15 years of age or younger, the distribution within that age range is of interest (Fig. 1). With the exception of 2 cases occurring at 6 months and 15 months of age, all the pyogenic granulomas were distributed in the 8 to 15 year age group. The earliest

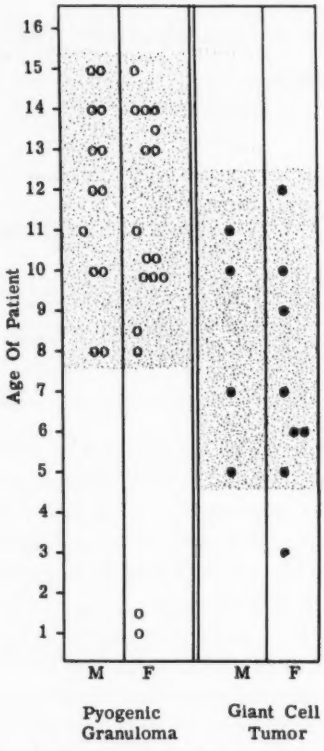

Fig. 1—Age distribution of gingival reparative granulomas at time of surgery

giant cell lesion was noted at 3 years of age and the remainder were found in the 5 to 12 year age group.

SIZE OF LESIONS—Gross descriptions of the size of pathologic lesions are notably inaccurate. Measurements, when given, indicated that although there was great variation in size within each group, the giant cell lesions were usually somewhat larger lesions at the time of surgery. Many of the giant cell lesions were described as involving as many as three teeth, for example, "lesion buccal to lower left cuspid and first and second bicuspid,"

whereas the pyogenic granulomas were most often indicated as arising interproximally or otherwise in relation to a single tooth. A further estimate of the relative size of the specimens was obtained by measurement of the tissue sections through their widest diameter. These crude estimates make no allowance for fixation shrinkage but do give a relative measurement. The pyogenic granulomas averaged 7 mm. and the giant cell reparative granulomas averaged 10 mm. in their greatest diameter.

DURATION OF LESION—The duration of each of the lesions included in this study was recorded in order to give some clue as to the rapidity of growth. Unfortunately, many of the histories failed to record this information. It is understood that such information can be grossly misleading since these lesions are not notably painful or even inconvenient except when they interfere with the occlusion of the teeth and mastication or bleed excessively. Most of the patients sought aid from the dentist at least after a two or three month period.

No correlation could be established between the size of the lesions and their duration except for those present less than two weeks, which were noticeably smaller than those of longer duration. After this interval, many of the lesions apparently demonstrated rapid growth until reaching a certain relatively constant size. For example, one pyogenic granuloma with a duration of 36 weeks was no larger than another pyogenic granuloma with a duration of 6 to 8 weeks. It is of interest that one pyogenic granuloma, reportedly of four weeks' duration, recurred and was excised 10 weeks later. The recurrent lesion was essentially the same size as the initial lesion. A similar observation was made for a giant cell reparative granuloma of 6 to 8 weeks' duration. The parent observed that the lesion recurred 2 weeks later. The recurrence was excised 5 weeks later and appeared to be the same size as the original mass.

LOCATION—In all cases of pyogenic granuloma included in this study, the lesion was located on the gingivae except for 1 lesion on the tongue and 2 lesions in which the location was not given. All giant cell reparative granulomas, of course, occurred on the gingivae although in 3 cases this location was not specifically recorded. The majority of both lesions were located on the labial or buccal aspect of the teeth except those occurring in the maxillary incisor regions where there appeared to be a somewhat greater tendency toward a palatal location. Two cases of pyogenic granuloma and 2 of giant cell reparative granuloma were reported to involve both buccal (or labial) and lingual aspects of the teeth. The approximate locations of these lesions with respect to individual teeth or groups of teeth is given in Figures 2 and 3.

No giant cell reparative granuloma was recorded posterior to the first permanent molar region, an observation made by other investigators.

TRAUMA—A definite relation between the occurrence of these lesions and trauma, erupting teeth, loss of deciduous teeth or other irritational stimuli could not be established because of inadequate histories. Three cases of pyogenic granu-

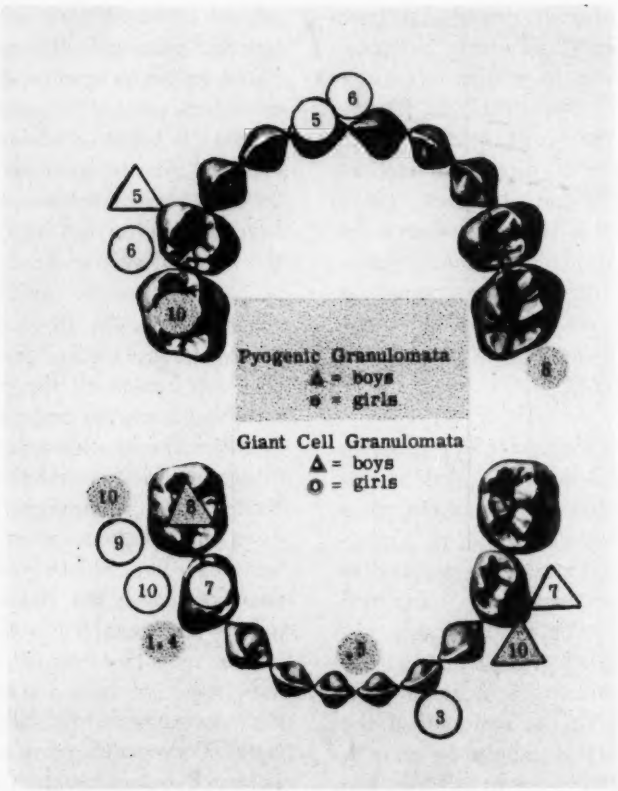

Fig. 2—Location of gingival reparative granulomas in relation to individual deciduous teeth. Age of patient is indicated for each lesion. Lesions shown over occlusal surfaces of teeth were described as occurring in indicated edentulous region. Lesions for which precise location was not given in the history are not shown on chart

loma appeared to be associated with the loss of a deciduous tooth or eruption of a permanent tooth. One case was associated with a retained deciduous root in an 8 year old boy, and 1 other case occurring in the incisive papilla region was apparently related to incisive trauma. In 2 cases, the onset of the pyogenic granuloma was related to the patient's having received a blow to the mouth.

In only 2 cases of giant cell reparative granuloma was there a history of traumatic injury. In 1 instance the history described a "lesion between the permanent upper central incisors of 6 to 8 weeks' duration, beginning apparently at the time of loss of the deciduous upper central incisors," whereas in the other the lesion occurred over an unerupted permanent maxillary central incisor.

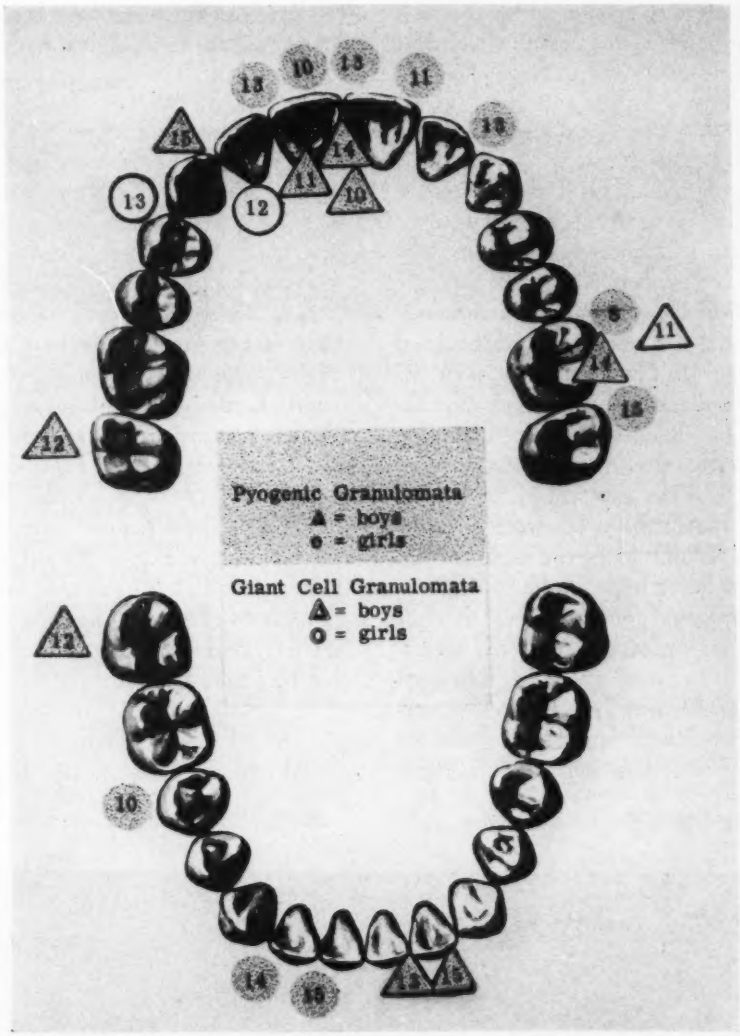

Fig. 3—Location of gingival reparative granulomas in relation to individual permanent teeth. Age of patient is indicated for each lesion. Lesions shown over occlusal surfaces of teeth were described as occurring in indicated edentulous region. Lesions for which precise location was not given in the history are not shown on chart

It is tempting to imply some sort of relation between age and location (and thus to loss of deciduous teeth and eruption of permanent teeth) of these lesions. Within the age range selected for this study, the dentition is constantly chang-

ing, and a direct relation to these factors would be valid only if these lesions were found exclusively in children.

CLINICAL APPEARANCE—The clinical differentiation of the pyogenic granuloma and the peripheral giant cell reparative granuloma is difficult or impossible since both lesions were often described as a painless, soft, red to purple, hyperplastic mass attached to the gingiva or mucous membrane by a sessile or pedunculated base (Fig. 4). The surfaces of these lesions were described variously as smooth, granular or lobulated, and ulceration was a common feature. Suppuration was not mentioned in any protocol.

Provisional diagnoses were given in only very few instances, the usual clinical impression being hyperplastic tissue. Two cases of pyogenic granuloma were thought clinically to be giant cell reparative granulomas and 1 case of pyogenic granuloma was identified correctly at the time of surgery. Other clinical impressions given for either of these lesions were fibroma, papilloma, fibrosed hemangioma, fibroid epulis, hemangioma, and gingival hyperplasia.

GROSS FEATURES—The gross appearance of hemisected, Formalin-fixed specimens was frequently characteristic in the case of the giant cell reparative granuloma. This lesion often presented numerous small, dark-brown foci on the cut surface. The main body of the tumor was usually well defined and separated from the overlying epithelium by a thin band of normal-appearing connective tissue. In contrast, the pyogenic granuloma, although presenting hemorrhagic foci, was not clearly demarcated from the surface epithelium.

Since these features often were altered by such factors as surface ulceration, manipulation at surgery and maturity of the lesions (especially the pyogenic granuloma), characteristic gross criteria could not be established.

HISTOLOGIC FEATURES—The microscopic criteria used for the diagnosis of

Fig. 4—Left: Pyogenic granuloma of approximately four weeks' duration in 15 year old boy. Mass bled easily on brushing of the teeth but was not painful. Right: Peripheral giant cell reparative granuloma in six year old girl. Mass was reported to have developed shortly after loss of deciduous central incisors

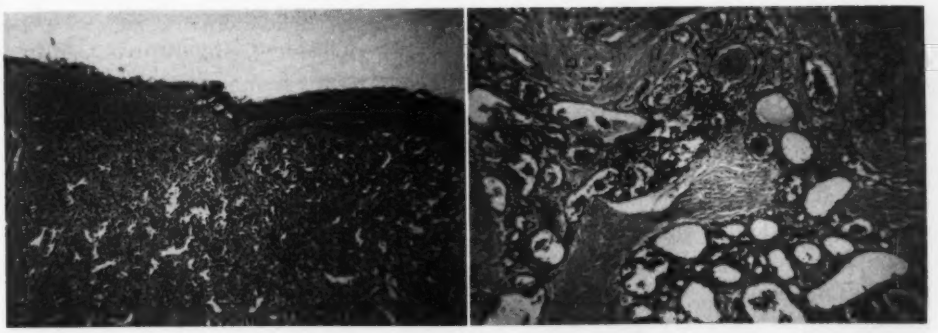

Fig. 5—Left: Low power view of pyogenic granuloma showing ulceration with heavy fibrinous exudate. Numerous capillary spaces are evident throughout specimen. Right: High power view of pyogenic granuloma demonstrating numerous endothelial-lined spaces, some of which are packed with red blood cells. Connective tissue trabeculae separate groups of vessels

typical cases of pyogenic granuloma and peripheral giant cell reparative granuloma have been adequately described.[1-6]

The pyogenic granuloma is a granulomatous overgrowth of the connective tissue characterized by a marked proliferation of endothelial cells which may vary from strands or sheets of endothelial cells to large, multiple, endothelial-lined blood channels (Fig. 5). The covering epithelium is often thin with areas of ulceration covered by a heavy fibrinous exudate (Fig. 5, left). Considerable variation in the amount of inflammatory cell infiltration is noted, and this is related in part to the presence of ulceration, previous injury or other factors.[1] Progressive fibrosis with obliteration of the vascular spaces occurs in mature lesions.[1,3]

The giant cell reparative granuloma also is a granulomatous proliferation of young fibroblasts with the additional feature of large numbers of multinucleated giant cells (Fig. 6, left). Although these

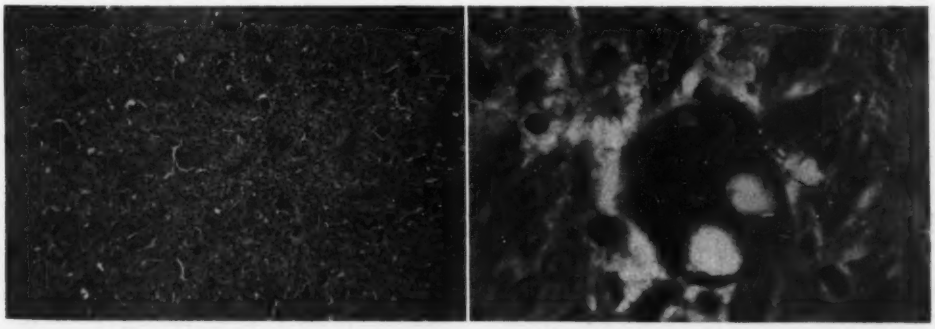

Fig. 6—Left: Low power view of peripheral giant cell reparative granuloma showing numerous multinucleated giant cells distributed diffusely in a granulomatous stroma. Right: High power view of peripheral giant cell reparative granuloma showing multinucleated cell with large vacuoles

cells are in no sense pathognomonic of the peripheral giant cell reparative granuloma, the granulomatous stroma being the essential part of the lesion, they have caused considerable speculation. These cells bear some resemblance to the osteoclast; they generally contain 5 to 100 nuclei distributed centrally within an eosinophilic, or occasionally hematoxyphilic, cytoplasm (Fig. 6, right). Numerous areas of hemosiderin pigmentation or extravasation of red blood cells may be seen most often around the periphery of the lesion. The giant cells are often intimately associated with the blood vessels, and occasionally appear to be originating from or within these structures.[7] The giant cell reparative granuloma is also a surprisingly vascular lesion, although discrete endothelial-lined vessels are not as prominent as in the pyogenic granuloma. The main body of the tumor is usually separated from the covering epithelium by a relatively normal band of connective tissue, although in many instances the surface is ulcerated.

The described histologic features were used to categorize the lesions reported in this study. The individual cases then were compared to determine histologic variations within each group and histologic similarities between the two groups.

The cases of pyogenic granuloma included in this study were not remarkably different histologically from similar lesions occurring in adults. Interestingly, 11 of the 30 pyogenic granulomas demonstrated calculus in the histologic section, whereas only 3 of the 14 giant cell lesions had this feature. Attempts to separate these lesions into histologic types according to the patient's age were unsuccessful. An attempted correlation between the histologic appearance of lesions of reported short duration (four weeks or less) and those of longer duration similarly was unrewarding. A distinct trend toward increased collagenization of the stromal tissues could not be observed in all the older lesions. Histologic features such as a reduced number of vascular spaces, thickened vessel walls, and increased collagenization were observed in lesions of two weeks' duration as well as those of longer duration. Kerr[1] made similar observations in lesions present for as long as 20 years and noted that these features were found in older lesions in various stages of healing. It appeared from observations made here that the wide histologic variation is influenced predominantly by factors other than the age of the patient or the duration of the lesions.

TREATMENT—Nearly all cases of pyogenic granuloma and peripheral giant cell reparative granuloma were treated in a conservative manner by simple surgical excision. In 3 instances of giant cell lesions, the associated teeth were extracted at the time of excision of the mass; in 2 of these instances the lesion was known to be a recurrence. In addition, there was 1 recurrence in a patient not treated by tooth extraction. There are no records of additional recurrences in any of these cases. Only 1 pyogenic granuloma was treated by tooth extraction in addition to excision of the lesion. Four of the 30 pyogenic granulomas were stated to be recurrent lesions, often having been removed previously by a dentist or physician, perhaps inadequately.

The limited number of recurrences in both groups and our own experience with these lesions indicates that simple surgical excision without accompanying extraction of the associated tooth is the treatment of choice. If recurrence does follow, even a second excision without extraction would appear indicated because of the innocuous nature of the lesions.

■ *Summary and Conclusions*

Pyogenic granulomas (30 cases) and peripheral giant cell granulomas (14 cases) occurring in children were compared according to incidence, sex predilection, age and race of the patient, duration, location, relation to trauma, clinical appearance and histologic features. The following observations were made:

1. The pyogenic granulomas all occurred in the 8 to 15 year age range with the exception of 2 cases occurring at 6 and 15 months of age. The peripheral giant cell reparative granulomas were grouped in a slightly younger age group, 5 to 12 years, with the exception of 1 lesion in a 3 year old girl.

2. No definite sex predilection was noted either in the cases of pyogenic granuloma (13 boys and 17 girls) or giant cell granuloma (6 boys, 8 girls).

3. Although the giant cell lesions as a group were somewhat larger than the pyogenic granulomas, no correlation between duration and size could be made, since these lesions characteristically exhibited rapid growth until a certain size was obtained.

4. Although these lesions were frequently associated with the loss of deciduous teeth, eruption of permanent teeth, physical trauma or other irritational stimuli, a definite correlation could not be established.

Pyogenic granulomas and peripheral giant cell reparative granulomas are similar in clinical appearance, and histologic examination is necessary for definitive diagnosis.

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■ Opinions

The prejudiced and obstinate man does not so much hold opinions, as his opinions hold him.—*Edwards.*

Use of premedication in dental treatment for mentally retarded and handicapped patients

■ *John B. Kennedy, Jr.,* D.D.S., Porterville, Calif.*

Premedication to accomplish dental treatment has been used by some dentists a great deal and by many others not at all. The knowledge and experience necessary for proper evaluation of premedication drugs has come very slowly, and it is to be expected that dentists working with large numbers of handicapped children in institutions or clinics should lead the way. However, many of the procedures used by such dentists are acceptable only to the hospitalized patient under complete care of a treatment team, and the private dentist treating only on an outpatient basis must proceed with caution and necessary modification.

This paper is a report from the Dental Division of Porterville State Hospital, a hospital for mentally retarded patients, on the use of premedication drugs.

The objectives of premedicating some of our patients for dental treatment are:

1. To calm fears and reduce apprehension.
2. With the most uncooperative patients, to place them in an analgesic and tractable state by the safest and most convenient means.
3. To establish a dosage of premedication for future and continued treatment.
4. In some patients, to obtain future cooperation of the patient without premedication.

The more extensive and complete the treatment program, the more premedication becomes a necessary adjunct. Holle[1] at the Hamilton County Diagnostic Clinic for the Mentally Retarded at Cincinnati states: "Only 3% of the patients require general anesthesia; of the 97% of the cases done without general anesthesia, 62% receive premedication and the remaining 35% are given care without any premedication." At the Porterville State Hospital, records show premedication of approximately 75 patients during the past three months. This represents 5 per cent of patients seen and does not represent a true percentage of the total population at the hospital which might need premedication. We do not have the staff to carry out total treatment for every one of the patients and must devote our time to those patients who can benefit the most from treatment and through their cooperation permit us to accomplish the most treatment. Treatment for relief of pain or infection, of

course, is given priority over all other treatment and is accomplished by whatever means is necessary for any patient. We are proud of our dental program and our patients show good dental care.

A dentist could remove a tooth by physically overpowering a patient or by using general anesthesia. We do not consider this advisable if there is any other way to accomplish treatment, as certainly further treatment then becomes even more difficult. Restorative dentistry has not been accomplished to any great extent in many institutions and clinics throughout the country for very many patients until recent years. The reason for this has been inadequate dental facilities and insufficient staffing of clinics with dentists and auxiliary personnel, slow recognition of the value of dental treatment, and inexperience and lack of knowledge of the use of premedication and general anesthetic technics. I understand that now some dental colleges are making an effort to add teaching and training programs which include treatment of the handicapped, hospital dentistry, and more general anesthesia and operating room experience.

I wish to make it clear I am not recommending the drugs nor combinations of drugs mentioned in the following paragraphs. This paper represents a report of our experiences to this time. We continue to change as our learning and experiences expand. New drugs or new findings about older drugs constantly become available and must be added to our armamentarium. Our goal is the most efficient and least hazardous methods and not merely an acceptable procedure which will aid with some of our patients most of the time. An ideal would be treatment for every patient under safe and convenient premedication whenever treatment cannot be accomplished without premedication.

The premedication dosage is arrived at in much the same manner as does Album[2] and his associates at the Dental Facilities of the Society for Crippled Children and Adults and at Childrens Hospital at Philadelphia. A minimum dosage is used and effects evaluated; if medication is adequate, treatment is accomplished. If the premedication is not adequate, a minimum booster dosage is given. Proper time is permitted between dosages and after for proper evaluation of its effect. If treatment cannot then be accomplished, the patient is dismissed and on another appointment premedication is started with the total of the initial plus the booster dosage. The same procedure is repeated on subsequent appointments until treatment can be accomplished or we have approached the safe limits for drug administration for the particular patient.

In every order for premedication drugs, consideration must be given to variations in size, age, weight, physical well-being and present medications the patient is now on or has recently had. Rules for drug dosage by age and weight are not too reliable for mentally retarded and particularly hyperactive children, and, though used to guide us, are often found ineffective.

Those patients we premedicate may be grouped, for this purpose, as follows:

Group I—Nervous patients who are high-strung, noisy, obviously or easily upset but not too resistive. Sedation usually is achieved with oral secobarbital.

Group II—Disturbed and resistive patients with a higher level of intelli-

gence. The sedation used is one of the following:

a. Chlorpromazine administered intramuscularly.

b. Promethazine administered intramuscularly.

c. Other tranquilizing agents may have equal or better qualities, but these are the two we have specific experience with at the present time. Some dentists are reporting good results with hydroxyzine hydrochloride. This drug may be very useful for outpatient treatment, because it leaves the patient mentally more alert.

Group III—Disturbed and resistive patients with a lower level of intelligence. The sedation used is one of the following combinations:

a. Chlorpromazine plus meperidine hydrochloride, both administered intramuscularly.

b. Promethazine plus meperidine, both administered intramuscularly.

c. Promethazine plus meperidine plus scopolamine, all administered intramuscularly.

Group IV—Very stubborn and resistive patients who are older and larger in size (very difficult to handle). Some of these patients will respond to the medications already mentioned and therefore usually receive less medication to start with. Most of our patients in this group will have had treatment attempted with everything from no medication, oral sedation, and through all the various combinations, with a complete record of their response. Some of the combinations used follow:

a. Pentobarbital or amobarbital plus meperidine plus scopolamine, all administered intramuscularly.

b. Pentobarbital or amobarbital, usually administered intravenously.

A few of these patients can be treated safely only under general anesthesia.

Group V—Physically handicapped children, such as those with cerebral palsy, who may have spasticity, athetosis, rigidity, tremor and atonia. These patients require very little or no premedication. Occasionally, a sedative such as oral secobarbital sodium is used for their own benefit, as they so often try too hard to help. An understanding approach, gentle and calm work habits, and some support to protect the patient in a strange environment and from his own involuntary movements during the procedures are successful.

Group VI—This group includes those with special problems, and each case is considered individually. An example is a mentally retarded deaf child who may be impossible to treat with safe dosages of premedication below the level of general anesthesia. This problem, I believe, may be approached through establishing communication with the child.

The balanced combination of drugs can be used safely to produce a desired effect for an individual patient treatment problem. When combining drugs one must acknowledge their potentiating and enhancing action and proportionately reduce the dose of each. Thereby, the desired effect may be obtained without the undesirable side effects resulting from large doses of a single drug.

The drugs we use are mentioned

here with what we believe are their principal actions in dental premedication and in particular when combined as we use them.

1. Barbiturates—hypnotic, sleep-inducing, calming effect.

2. Meperidine—analgesic, hypnotic. Raises the pain threshold and therefore protects the hypnotic effect of barbiturates or tranquilizing drugs.

3. Scopolamine—hypnotic, antisialogogue. Enhances the hypnotic effect of most other drugs and protects this state by raising the pain threshold. It is obvious that a dry mouth is helpful for dental treatment and to the premedicated patient. Scopolamine is also said to have an amnesic effect.

4. Promethazine—reduces apprehension. It is a relaxant and a hypnotic and inhibits nausea.

5. Chlorpromazine—makes the patient more tractable and produces less desire to resist. The patient follows suggestions without being able to resist.

When the barbiturates are used alone on the hyperactive child, rather large doses are required to induce hypnotic effects. The start of treatment acts as a stimulus which revives the patient, who then is more excitable than before. This factor is recognized by many who have had experience with treatment for the handicapped or mentally retarded child. The hypnotic effect of barbiturates can be resisted under certain conditions, namely, dental treatment, for several hours and then may have a sudden or cumulative effect. Although the patient appears to be fully awake and responsive when he leaves the dental clinic, he could collapse later. Patients must have care and observation until the effects of the medication have disappeared completely.

The narcotic meperidine, being principally an analgesic, enhances the hypnotic effect of other drugs and raises the pain threshold to protect this hypnotic state. Although our local anesthetic almost completely eliminates pain, the injection of the anesthetic, itself, is feared by many patients. Therefore, meperidine in its analgesic action aids in reducing all pain experience to the minimum. The injection of the premedication usually is not associated with the dental treatment because it is not given in the patient's mouth and in this hospital not even administered at the dental clinic. Morphine and meperidine produce nearly the same effect with the same relative dosage on most patients. Other analgesics might be used, but their wide range of tolerance and effective action may make them unreliable for our use. This is most important in using combined drug premedication.

*Chief of dental service, Porterville State Hospital.

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■ On Laziness

Laziness travels so slowly that poverty soon overtakes him.—*Benjamin Franklin.*

The oral-facial-speech problems of the aging: a challenge to the health care professions

■ *Irvin V. Uhler,* D.D.S., Lancaster, Pa.*

The oral-facial-speech problems of the aging are receiving the attention of the dental profession. These problems involve: (1) the effects of mutilating surgery; (2) injuries that cripple and deform; (3) congenital and acquired deformities, and (4) oral problems of the aged and senile.

All these may affect the major organ of communication—the mouth and associated structures.

In order to understand these problems, it is necessary to face them squarely —unpleasant, distasteful and, in some instances, ghastly as they may be.

Facial deformity is tragic enough in a person who has lived with such a handicap all his life, but it becomes devastating when disease or necessary mutilating surgery or both suddenly transform an individual's face into a hideous condition, making withdrawal from family, friends and society necessary. At the same catastrophe, all means of communication may be lost, compounding the psychic trauma. No single profession nor discipline can cope with such a situation. It requires a team approach involving many professions and disciplines, in a well-oriented, orderly, long-range treatment plan. Literature is rapidly accumulating on the oral manifestations of the aging process and the dental problems involved in the care of the aged. Researchers have been hard at work for many years on these problems, and much scientific and theoretical knowledge is available. Therefore, it is my purpose to discuss the clinical side of gerodontics.

■ *Effects of Mutilating Surgery*

Surgery for malignant disease may involve any or all of the auxiliary organs of speech: the lips, the tongue, the teeth, the palate and the cheeks. It may involve part or all of the lower jaw, or the major portion of the right or left portion of the upper jaw. Plastic and reconstructive surgery has worked miracles in achieving closure, pleasing cosmetic results and restoration of these regions, but there are many situations in which insufficient tissue remains to provide closure, and inadequate blood supply makes grafting an impossibility. By use of preoperative impressions of the face, models can be made. On these models, the areas of anticipated surgery may be cut away and immediate

plastic replacements developed. Any operative deviations made necessary at surgery can easily be compensated for by the use of self-curing acrylic resins. Patients returning from the operating suite with such tissue replacements are not subjected to additional trauma from the facial expressions of shock by those caring for them or visiting them. When ambulatory, they may mingle immediately with other patients. The tissues surrounding the operative site fare better as a result of the support from the implant and have less tendency to invaginate and form adhesions.

It is known that speech is lost after surgery is performed on the larynx for removal of malignant disease. It can also be lost by extensive surgery on the jaws and associated structures such as the tongue and palate. The Lancaster Cleft Palate Clinic for many years has been making obturators for persons whose soft palate is either missing or short. Into this prosthesis, or into a denture if the patient is wearing one, a small audio emitter has been incorporated which gives speech to the patient whose larynx has been removed. Through this, the patient can communicate his needs, in most instances, immediately on recovery from anesthesia. It has been helpful as well to those unable to master oropharyngeal speech. This phase of rehabilitation is approached simultaneously by (1) the prosthodontist with experience in obturator positioning in the throat, (2) the speech pathologist employing scientific instrumentation for speech measurements, and (3) an electronic engineer utilizing sound x-ray motion picture apparatus to evaluate the residual speech mechanism. Sufficient emphasis cannot be placed on the need for proper preoperative evaluation and planning, and preparation of immediate prosthesis for patients in imminent need of disfiguring, mutilating, orofacial surgery, as well as surgery involving speech-producing regions.

In the management of malignancies, especially in the aging patient, irradiation may be the choice of treatment rather than surgery. If the zone to be irradiated includes tooth-bearing regions, and the patient has the prospect of long-term survival, all teeth must be removed. At no time after intensive irradiation involving the tooth-supporting structures can removal of teeth be safe. Although the irradiation may have been done many years previously, fulminating osteonecrosis will result. This complication increases with the age of the patient, and in the aged may arise from any internal or external trauma, or may, indeed, arise spontaneously. Dentures must be constructed carefully to avoid any denture trauma. The patient should not be kept edentulous, as an irradiated alveolar process is subjected to trauma from food intake when uncovered by dentures. Again the team approach is essential, and the dentist and irradiation personnel must work in close harmony. Where osteonecrosis takes its toll, the replacement technics described will be effective once sequestration is complete and accompanying infection is cleared up.

■ *Injuries that Cripple and Deform*

Today's highway traffic accidents produce mutilations that equal those of the surgeon's scalpel attacking an extensive malignancy. In the facial regions

where wounds transcend surgical skill, much of what has already been discussed will offer some solution. The aged patient's osseous structures and investing tissues are very deficient in reparative potential, and severe trauma many times results in irreparable loss of soft tissue and bone. Beyond the seventh decade, malunion of fractures is a common complication. The "purse-string" mouth is an undesirable aftermath of trauma involving the lips, and in the aged patient, surgery usually results in disappointment. The prosthodontist can alleviate this unsightly condition by modification and plumping of the dentures. In summation of this phase, management of tissue problems resulting from trauma in the aged patient is essentially the same as for problems resulting from loss of tissue through surgery for malignancies.

■ *Congenital and Acquired Deformities*

As the human tissues age, deformities in the orofacial region that have undergone surgical or prosthetic correction, as well as those that have received no attention whatsoever, must be watched with increasing frequency, especially in the late seventh, eighth and ninth decades. Blood supply diminishes, and nutritional and reparative processes are penalized. In the lower jaw, large nutrient canals may develop as the blood-supplying system struggles to provide adequate nourishment to the region. These canals can become a weak spot in the extremely resorbed lower jaw, and the slightest trauma may cause a fracture. Tissues bordering on previous operative sites must be inspected with regularity, because diminished blood supply with its attendant sequelae will make its presence known in these zones. All bearing points of prosthetic devices must be policed regularly, as the same conditions are present here. Any irritation must have its causative factor eliminated promptly, lest it become a carcinogenic agent.

■ *Intraoral Problems of the Aged and Senile*

CHEILOSIS—Chronically sore areas in the angles of the mouth usually are associated with riboflavin deficiency, and the nutritionist must join the treatment team. In the aging person the sores may be precipitated by loss of intermaxillary space. This loss may be due to abrasion of teeth, as in the tobacco chewer, faulty masticating habits, and bruxism. These factors may be eliminated by construction of dentures that restore or accent the canine eminence and correct the loss of vertical dimension. If sufficient tooth structure is present, the crowning of abraded teeth and replacement of missing teeth will make the same correction. The increased masticatory efficiency together with nutritional support results in the disappearance of these lesions.

CLOSURE OF INTERMAXILLARY SPACE—Loss of intermaxillary space is due, as stated previously, to loss of teeth, attrition of teeth, resorption of the ridges by dentures uncorrected to compensate for aging changes and resorption. Early signs are deepening lines from the angles of the nose to the corners of the mouth, and from the corners of the mouth to the chin. The effect of this slow loss of vertical dimension involves the temporomandibu-

lar joint. The changes caused by malpositioning of the condyle in the glenoid fossa, through closure of the bite, or loss of intermaxillary space, may result in pain in the joint region and annoying neuralgias over the side of the face and in the tongue. The indicated procedure is replacement of dental structures and frequent denture correction as discrepancies appear.

The aging person must be indoctrinated with the need for periodic denture correction and alteration. Such correction may be as simple as rebasing, or as complex as new denture construction. A near normal intermaxillary space must be maintained and compensation made for the resorption of alveolar areas. In instances of extreme ridge resorption, the efficiency and stability of the denture will be increased if the ridge is deepened, by surgically deepening the mucobuccal fold, thus increasing the potential size of the denture flanges.

ILL-FITTING DENTURES—Uncompensated-for aging changes, and the combination of complete upper dentures against lower anterior teeth retained from the natural dentition and unreplaced missing lower posterior teeth, will quickly destroy the denture-bearing ridges, replacing them with masses of hypertrophied tissue. This can lead to malignant changes via the path of chronic irritation unless surgical correction is done, followed by accurate denture construction. Ill-fitting dentures may cause knife-edged ridges. Unless these are surgically corrected, severe pain will occur when biting and chewing forces are applied. Bulbous tori must be removed if eating habits or dentures cause irritation. The overlying tissues are very thin and poorly nourished, with no resistance to stress. Lack of ridges for denture bearing is a common finding. This lack may be due to the wearing of poorly fitting dentures for a long time, the ravages of periodontal disease over a long period prior to tooth removal, as well as the aging process. Today's technics have made great strides in the management of this problem. Total absence of the mandibular ridge may be overcome by the use of implant dentures. As the lower jaw resorbs through the aging process, two complications arise:

1. The genial tubercles gradually reach the surface of the denture-bearing region. They then become sources of chronic irritation and must be removed, and the muscle attachments must be altered.

2. The mental foramen emerges on the crest of the ridge. Unless relieved in the denture base, paresthesia and pain in the region of the symphysis will be evident. The contents of the foramen sometimes must be surgically relocated where they emanate from the bone.

Arthritic changes may gradually reduce temporomandibular joint function to a point where complete ankylosis or immobility may occur. Condylectomy, or removal of a section of the neck of the condyloid process, may be indicated to restore masticatory function.

In the aging person who retains many natural teeth, the ravages of periodontal disease must be fought endlessly, as senile alveolar atrophy is constantly weakening the supporting structures of the teeth. Regular removal of calculus deposits is required from two to four times

a year. In instances of deepening periodontal pockets, gingivectomy may be necessary to prevent infection of the gingival sulcus and further bone resorption. Occlusal equilibration may be necessary as dental structures become abraded, but usually rehabilitation of the biting and grinding surfaces requires building up of the natural dentition to restore normal vertical dimension.

SMOKING HABITS — Smoking, especially pipe and cigar smoking, may result in leukoplakia. Unless checked, malignant degeneration may occur. This is especially true in the aged with friable, poorly nourished mucosal surfaces.

References to teamwork and group approach have frequently been mentioned throughout this paper. In the dental care of the aged there is another area of paramount importance where teamwork is necessary. In the tense, emotionally disturbed aged patient, tranquilization may well be the determining factor in successful management of the geriatric denture patient. Patients without teeth eat less and less unless kept tranquilized to the point where they will tolerate dentures. Prosthetic failures today, in competent hands, are due more to tissue deficiencies and emotional states, than to deficiencies of material or technics of construction.

In this paper, some gerodontic problems have been discussed from the clinical point of view. Dentistry's labors to contribute to the management of the oral-facial problems of the aging person have been described. As scientific knowledge increases and is disseminated, this portion of the health team will bear its responsibilities.—548 *North Duke Street.*

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■ DARWINISM

It is clear that Darwin's success was due to several common vices as well as to several uncommon virtues. His gifts as an observer in all fields concerned with the needs of a theory of evolution were extraordinary. His industry and patience in collating and editing his own observations as well as other people's were hardly less remarkable. On the other hand, his ideas were not, as he imagined, unusually original. He was able to put his ideas across not so much because of his scientific integrity, but because of his opportunism, his equivocation and his lack of historical sense. Though his admirers will not like to believe it, he accomplished his revolution by personal weakness and strategic talent more than by scientific virtue. *C. D. Darlington, Scientific American, May 1959.*

Trifluoroethyl vinyl ether-nitrous oxide anesthesia for oral surgical operations for ambulatory patients

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Various studies since 1951 reveal trifluoroethyl vinyl ether to have properties making it desirable for ambulatory oral surgery patients. The properties of this agent are reviewed, and a clinical study is reported. The patients ranged in age from 16 months to 65 years. Forty-eight of the patients were ambulatory. The type of vaporizer used as well as the type of premedication received varied. No unusual complications developed. Induction as well as recovery was rapid, and postoperative emesis occurred in only 3 per cent. The study indicates that the agent is a useful drug for anesthesia in ambulatory patients.

Anesthesia for the ambulatory patient is a challenging field. It requires modification of the technics used for inpatient anesthesia. This is even more true for the dental patient, since the surgeon must work within the airway. Anesthetic agents and technics for dental anesthesia for ambulatory patients should possess the following characteristics: (1) rapid, pleasant induction, (2) relative ease of administration with a wide margin of safety, (3) relative nonflammability, (4) rapid rate of recovery, and (5) low incidence of postanesthetic complications.

Recently, a new volatile liquid inhalation anesthetic agent, trifluoroethyl vinyl ether, has become available for clinical trial. Reports in the literature and previous experiences of one of us (W.H.L.D.) with this compound have indicated that it possesses many of the properties desired of an agent for use in ambulatory patients. These studies showed that this agent is much less flammable than divinyl or ethyl vinyl ether, would allow much more rapid recovery than the intravenous agents, and would have a greater potency and lower incidence of postanesthetic nausea and vomiting than trichloroethylene.

Trifluoroethyl vinyl ether was first prepared by Shukys in 1951. Krantz and co-workers[1] reported a laboratory investigation of its pharmacologic properties and anesthetic action on rats, dogs and mon-

keys in 1953. They were impressed with its anesthetic properties and absence of side effects. Clinical trial was initiated that same year.

■ *Physical and Chemical Properties*

Trifluoroethyl vinyl ether (Fluoromar) is a clear, colorless liquid with a characteristic sweetish odor. Literature from the manufacturer indicates that it has the following physical properties: molecular weight, 125; boiling point, 43.2°C.; specific gravity at 25°C., 1.13; vapor density compared to air, 4.4; vapor pressure at 25°C., 370 mm. of mercury; solubility in water at 30°C., 0.4 cc. per hundred cubic centimeters. Its lower limit of flammability in oxygen is 4.0 per cent; in air, 4.2 per cent, and in nitrous oxide-oxygen, 4.0 per cent.

The chemical formula is similar to that of ethyl vinyl ether except that three fluorine molecules replace the three hydrogen molecules on the first carbon atom of the ethyl radical ($CF_3CH_2-O-CH_2=CH_2$). Trifluoroethyl vinyl ether is prepared by the reaction of acetylene and trifluoroethanol. The agent is very stable. Trifluoroethyl vinyl ether vapor, oxygen, carbon dioxide and water vapor may be circulated over soda lime at temperatures of 70°C. to 100°C. without any chemical breakdown. As indicated by the manufacturer, this stability in the presence of hot soda lime allows use of the agent by absorption technics.

Although trifluoroethyl vinyl ether is flammable, vapor concentrations required to produce analgesia and light anesthesia are below the lower limit of flammability. Package literature from the manufacturer gives the following information on flammability:

> In deeper anesthesia, the concentration of Fluoromar is above the lower limit of flammability, but the spark energy requirement to ignite a vapor near its lower flammability limit is much greater than the energy requirement to ignite a vapor whose concentration is in the middle of the flammability range. A 6% mixture of diethyl ether and oxygen will ignite with 1/30th the ignition energy necessary to ignite a 6% mixture of Fluoromar. Although Fluoromar must be treated as a flammable agent, the relative hazard of ignition during anesthesia is minimal.

It will not explode even in concentrations producing deeper planes of anesthesia. Once ignited, these mixtures burn feebly with poor propagation of the flame.[2]

■ *Pharmacology*

Krantz and co-workers,[1] using dogs and monkeys, found that trifluoroethyl vinyl ether had an anesthetic index of 2.35, a value comparing favorably to that of diethyl ether. The anesthetic index is determined by dividing the concentration of anesthetic vapor required to produce respiratory arrest by the concentration required to produce surgical anesthesia. These investigators also noted that blood pressure was not depressed by surgical planes of trifluoroethyl vinyl ether anesthesia, but the pulse rate was slightly increased. In another study investigators noted bradycardia and a drop in blood pressure associated with deep planes of anesthesia.[3] White and co-workers[4] anesthetized five dogs with trifluoroethyl vinyl ether and delivered epinephrine challenge without eliciting ventricular tachycardia. An occasional ventricular extrasystole was the only arrhythmia elicited. One week

later, using cyclopropane anesthesia, the same challenging dose of epinephrine elicited ventricular tachycardia in every dog. Other laboratory studies,[5] using dogs as experimental animals, demonstrated that trifluoroethyl vinyl ether anesthesia produced no alteration in blood cellular content or blood chemistry, and had no effect on the liver or kidney, even after repeated anesthesia.

Clinical tests of the pharmacologic effects of this anesthetic agent in man have yielded consistent results in observations made in several different research centers by Orth and Dornette,[3] White and co-workers,[4] Gainza and co-workers,[6] Sadove and associates,[7,8] Dundee and co-workers,[9,10] Slater,[11] and Dornette and associates.[2,3,5] Experiences of these investigators are summarized in the following paragraphs.

The onset of the action of trifluoroethyl vinyl ether anesthesia is very smooth and rapid, consciousness being lost in a matter of a minute or so and plane 1 anesthesia being reached within four or five minutes. Planes of anesthesia may be changed quickly, and recovery from anesthesia is very rapid with an almost immediate return of the protective reflexes. After anesthesia with this agent, there is some residual analgesia lasting from 15 to 30 minutes. This makes for a smooth, quiet recovery free of excitement due to pain from the operative site.

Trifluoroethyl vinyl ether has a characteristic odor that is not particularly unpleasant. Most patients will tolerate from 6 to 8 per cent concentration of the agent without coughing or objecting to its odor. Respiratory secretions are minimal and large doses of atropine are not indicated. Because of the lack of an irritating odor in the concentration used for anesthesia, the incidence of laryngospasm is minimal. During lighter planes of anesthesia, the respiratory pattern is not disturbed. Respiratory depression occurs in deeper planes of anesthesia, but anesthesia of such depth is not required for most oral surgical procedures. Respiratory patterns seen during anesthesia with this agent are very similar to those noted under diethyl ether anesthesia, except that the respiratory depression occurs in a lighter plane of anesthesia.

The general opinion is that muscular relaxation is but fair with trifluoroethyl vinyl ether anesthesia, being adequate for intubation in one third of a series of 77 patients.[9] The degree of muscle relaxation afforded with this agent varies directly with the depth of anesthesia and indirectly with the age of the patient. The younger the patient the better the degree of relaxation for a given plane of anesthesia.

In light planes of trifluoroethyl vinyl ether anesthesia blood pressure is not significantly affected. In deeper planes of anesthesia there is a progressive depression of the blood pressure that parallels the depth of anesthesia. Here again this greater depth of anesthesia is not necessary for most oral surgical procedures. Lightening the planes of anesthesia will produce a rapid reversal of this depression with return of the blood pressure to normal or near normal levels. In light planes of anesthesia, there is little or no change in pulse rate. In deeper planes bradycardia may develop, rates in the range of 55 to 60 per minute being reported.[6] This bradycardia does not mask blood loss. Tachycardia will develop in the presence of

operative hemorrhage with associated hypovolemia.

Cardiac rhythm is quite regular during trifluoroethyl vinyl ether anesthesia. Neither hypercardia nor epinephrine will produce any particular change in rhythm such as premature ventricular contractions.

Trifluoroethyl vinyl ether is found to be compatible with all the agents used for regional, inhalation and intravenous anesthesia. All the commonly used muscle relaxants have been employed with trifluoroethyl vinyl ether without any adverse side effects. The agent is compatible with the following vasopressors: epinephrine, nor-epinephrine, ephedrine, phenylephrine and methoxamine.

The incidence of nausea and vomiting after trifluoroethyl vinyl ether anesthesia is no higher than that observed after the use of other general anesthetic agents. Trifluoroethyl vinyl ether does depress respirations, and inadequate ventilation and hypercapnia may contribute to postanesthesia nausea and vomiting. If the respirations are adequately assisted during deeper anesthesia, or if light planes are maintained, the incidence of nausea and vomiting is minimal. Liver function tests, serum transaminase determinations, urinalysis and renal function studies have shown that the agent produces no significant changes in hepatic or renal function.

■ *Clinical Study*

This study was conducted at John Gaston Hospital and the University of Tennessee College of Dentistry Oral Surgery Clinics. In order to expand our experiences with this compound, 11 hospitalized patients were included with the 48 ambulatory patients to make a total of 59. The 59 patients in this study were unselected and ranged in age from 16 months to 65 years: 13 were between 16 months and 10 years; 12 were between 10 and 20 years; 17 between 20 and 30 years; 6 between 30 and 40 years; 6 between 40 and 50 years; 2 between 50 and 60 years, and 3 were 60 or older.

The majority of these patients were judged to be physical status 1 or 2.[12] Forty-three were judged to be physical status 1, 13 were status 2, 1 was status 3, and 2 were status 4.

Sixty-one oral surgical operations were performed on the 59 patients while they were under trifluoroethyl vinyl ether anesthesia. In 50 instances the procedure was a short exodontia procedure; in 4, open or closed reduction of a fractured mandible; in 3, full mouth extraction and alveolectomy; in 2, incision and drainage of a submandibular abscess, and in 2, hemimandibular resection.

The duration of anesthesia was as follows: in 17 patients, less than 10 minutes; in 31, 10 to 20 minutes; in 4, 20 to 30 minutes; in 1, 30 to 60 minutes; in 2, 60 to 90 minutes; in 3, 90 to 120 minutes, and in 3, more than 120 minutes.

Preliminary medication varied depending on the need of the patient and the operative procedure. Two patients received no preliminary medication; 1 received atropine alone, 34 received pentobarbital alone; 11 received pentobarbital and atropine, and 13 received a narcotic and atropine. Depressant drugs were kept to a minimum in outpatients, since early ambulation was a prime consideration. Most of the patients in this group received

no narcotic, but only small amounts of barbiturate to alleviate fear and apprehension. A narcotic was used in the hospitalized patients in whom there was preoperative pain, or if postoperative pain was expected.

Many of the patients did not receive a belladonna drug for preliminary medication, affording an excellent opportunity to study the effects of the anesthetic agent on respiratory secretions and vagal nerve activity.

Anesthesia equipment was of the standard type found in most hospitals. Vaporizers used included the Ohio Vernitrol, Foregger Copper Kettle, Trimar vaporizer, Ohio number 8 and McKesson ether vaporizer. The anesthetic machines used in the outpatient clinic were a Heidbrink Simplex and a McKesson Nargraf with a McKesson ether vaporizer.

Since many patients object to any strange odor, the anesthesia in most instances was started with nitrous oxide and air. The face mask or the nasal inhaler, as the case may be, was held just off the face for about eight or ten breaths. Then the mask was placed directly on the face and the mixture changed to 20 per cent oxygen and 80 per cent nitrous oxide. At this time, trifluoroethyl vinyl ether vapor was introduced into the breathing circuit and the concentrations thereof rapidly increased. When the Ohio Vernitrol or Foregger Copper Kettle vaporizer was used, the concentration was increased to about 6 or 8 per cent for induction and reduced to about 4 per cent for maintenance of anesthesia. Settings for other vaporizers varied depending on the type being used. The semiclosed technics, employing total gas flows from 6 to 8 liters per minute, were used in all but four instances.

Endotracheal intubation was deemed necessary in some of the longer procedures such as open reduction of a fractured mandible. In these instances anesthesia was induced intravenously with thiamylal sodium, usually 250 to 300 mg., followed by succinylcholine, usually 40 mg. As soon as the mandibular muscles relaxed, direct laryngoscopy was performed and a nasotracheal or orotracheal tube was placed under direct vision. Anesthesia was then maintained with trifluoroethyl vinyl ether and nitrous oxide.

Maintenance of anesthesia for 40 of the 44 short exodontia procedures was by the use of a standard nasal inhaler and an oropharyngeal partition. In the other four procedures, anesthesia was induced in the manner previously described, but when plane 1 anesthesia was reached, a nasal mask (Ohio number 1) was applied and connected to a circle absorption system. The nitrous oxide flow was discontinued and the oxygen flow reduced to 500 cc. per minute. This flow was necessary because of the leakage of gases around the oropharyngeal partition. Sufficient trifluoroethyl vinyl ether vapor was added to maintain an even plane of anesthesia.

One report in the literature suggests that the signs of trifluoroethyl vinyl ether anesthesia are somewhat obscure.[9] This opinion may have been based on the observation of pupillary size. In our study, pupillary size was not a reliable sign of the depth of anesthesia in all instances. Little difficulty was experienced in determining depth of anesthesia if the effects of the drug on respiratory activity and extraocular movements were used as signs.

When the respiration became rhythmic and regular, light plane 1 anesthesia was considered to have been reached. At this time there was still some lateral nystagmus. The eyes became centered and fixed at the time deep plane 1 or light plane 2 anesthesia was attained. This depth of anesthesia was sufficient for most oral surgical procedures. Although muscular relaxation was not profound, it was sufficient for the placement of a bite block.

In some instances the concentration of trifluoroethyl vinyl ether was increased until the respirations became noticeably depressed. Such depression is usually one of depth and not of rate. The rate may in fact be increased in these deeper levels. In such instances of respiratory depression there was little or no change in blood pressure, pulse rate or regularity. In view of these and other experiences with the drug, it was considered to have a relatively wide margin of safety.

There were no major complications or deaths in the series. During induction 2 of the 30 patients that did not receive belladonna drugs for preliminary medication developed moderate amounts of secretions that slowed induction considerably. Maintenance of anesthesia in these two patients was satisfactory. A third patient, a known alcoholic, received trifluoroethyl vinyl ether anesthesia for oral surgical procedures on two separate occasions. Induction was slow and excitement during the second stage was moderate to severe in both instances. This same patient also received cyclopropane for gastric resection during the same hospital admission, and the induction was similar to that experienced when trifluoroethyl vinyl ether and nitrous oxide were given for the oral surgery procedures. Three patients coughed during induction. This coughing was believed to be due to too rapid an increase in the concentration of trifluoroethyl vinyl ether and was corrected when the concentration was reduced.

Excessive adenoid tissue prevented adequate uptake of trifluoroethyl vinyl ether vapor in one patient. Anesthesia in this four year old child was induced with a full face mask. On changing to the nasal inhaler, the respiratory exchange through the nose was insufficient. Fortunately, only a single tooth was to be extracted, and the procedure was concluded hurriedly. Early in the series six patients exhibited an elevation of systolic blood pressure of from 20 to 40 mm. mercury shortly after induction. In four of these patients the respiratory rate also was increased. These findings were believed due to insufficient flows of gas for the semiclosed technics. Flow rates were increased from 5 liters per minute to 6 to 8 liters per minute during subsequent anesthesia, and the elevation of blood pressure and hyperventilation did not occur. No other alteration of blood pressure, pulse rate or cardiac rhythm was noted. There were no instances of vomiting during induction or maintenance in this series.

The postoperative course of the patients in this series was generally smooth. Three patients developed transient nausea, and two others vomited once each. Of the patients that had received only barbiturates as preliminary medication, 95 per cent had recovered sufficiently to respond to verbal command prior to leaving the operating room. All the patients in the series had regained their protective reflexes by this time. A moderate amount

of residual analgesia follows trifluoroethyl vinyl ether anesthesia, because only a few of the patients required analgesic drugs in the immediate postoperative period.

All patients were required to remain for observation for at least 30 minutes after termination of anesthesia, though many of these had recovered sufficiently to be able to leave the clinic in from 10 to 15 minutes. All patients in the ambulatory group were able to leave after one hour. If left undisturbed, many of the children would go to sleep as a result of the preliminary medication.

■ *Discussion and Summary*

Our findings are in general agreement with earlier studies by Slater,[11] Sadove and co-workers,[7,8] and Dundee and Dripps.[10] Trifluoroethyl vinyl ether produces a rapid, pleasant induction and allows smooth maintenance of anesthesia singularly free of serious side effects. Respiratory and cardiovascular depression, which may occur in deeper planes of anesthesia, are reversible phenomenon. A moderate degree of muscular relaxation is produced, sufficient for most oral surgical procedures if a bite block is used. Intravenous muscle relaxants, all of which are compatible with trifluoroethyl vinyl ether, may be employed in the adult to allow relaxation for laryngoscopy.

Recovery is rapid with early return of protective reflexes, consciousness and orientation. Ambulation follows in short order if preoperative depressant drugs are omitted or minimized.

Postoperative emesis was minimal (3 per cent) in our series. This finding was in agreement with the experiences of Slater,[11] but was much lower than that reported by one of us (W.H.L.D.) in an earlier study.[5] In retrospect, it is believed that the higher incidence of nausea and emesis reported in this earlier study was caused by hypercapnia consequent to inadequate ventilation during anesthesia.

Although trifluoroethyl vinyl ether must be considered a flammable agent, it is nonexplosive and will not burn in the concentrations required for light anesthesia.

This study indicates that trifluoroethyl vinyl ether is a useful drug for anesthesia in ambulatory patients, and deserves a place in the armamentarium of those administering anesthesia in dentistry.—*1934½ East Center Street.*

Fluoromar was supplied by the Ohio Chemical and Surgical Equipment Company.

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Fractures of the mandibular condyloid process: results of conservative treatment in 140 patients

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The literature contains many case reports of fracture of the mandibular condyloid process, and the technic for treatment. However, in few comprehensive follow-up studies has a truly objective attempt been made to evaluate the various methods of treatment that have been advocated so strongly. The existing confusion concerning the treatment of choice in a given instance is due in part to the fact that even among authorities little agreement is to be found. Moreover, much of the agreement that is found is not based on clinical follow-up studies.

Surgeons who treat patients with this condition have long been divided into two groups. One group advocates open operation and direct visual anatomic fixation of the fractured parts, if any displacement is present. In contrast, the other group favors the conservative method, that is, treatment by simple interdental fixation when dentition is present, and when it is not, by simple head bandage or other appliance to limit mandibular movement, even if displacement is present. In which of these two groups the surgeon finds himself depends on his training, surgical judgment, experience and philosophy on how he himself would like to be treated if faced with this decision.

The group advocating open operation for this condition has attempted to classify fractures of the mandibular condyloid process, and thereby to set down indications for open operation in an effort to justify the surgical procedure. Many such classifications exist; but, in general, authors of the group mentioned believe that the condylar fracture should be reduced surgically if the fracture ends are displaced, or if the head of the condyloid process has been displaced from the glenoid fossa.[1-3] It has been stated that excellent results usually are obtained by a conservative treatment plan; however, if patients treated conservatively are subjected to critical review, a compromise result would be seen in many instances.[2] Compromise results are listed as deviation of the jaw to the injured side, ankylosis and inadequate opening. It also has been stated that poor results can be expected from the conservative approach if one of

the following conditions is present: inadequacy of the patient's teeth for good interdental fixation; bony impaction of the fracture ends of the condyle; interposition of soft tissue at fracture sites; displacement of the mandible to the fracture side, and overriding of fracture ends. One authority believes that the conservative plan should be used only in unilateral undisplaced fractures of the condylar process.[3]

By and large, the conservative group believes that the only indication for open operation is displacement of the condyloid process of a magnitude and in a direction that render it impossible to reposition the mandible so that the teeth can be restored to normal occlusion. Such an occurrence, of course, is rarely encountered.

Three postoperative surveys of large numbers of patients who sustained condylar fractures have been reported: one by members of the Chalmers J. Lyons Club[4] in which 120 cases of mandibular condylar fracture were investigated; another by Krømer[5] in Norway, who examined the case records of 611 patients, 154 of whom had been treated for condylar fracture, and the third by MacLennan[6] of England.

Other surveys have been conducted on the incidence of fracture of the jaws, types of treatment, location of the fracture, and the like, but none of these studies deals specifically with follow-up results of treatment insofar as condylar fractures are concerned.

In the study by the Chalmers J. Lyons Club it was stated that "clinical statistics reveal that only eight per cent of mandibular fractures occur at the condylar site," whereas in Krømer's study of 611 patients who had sustained fractures of the jaw, 154, or 25 per cent, had fractures in the condylar region. In the present study of 400 patients, as will be seen later, 140, or 35 per cent, sustained fractures in the region of the condyloid process. Some discrepancy in these percentages might be attributed to the fact that the severity of displacement of the fractured condyloid process is frequently not obvious on clinical examination, as there does not seem to be any definite relation between displacement of the condyle and clinical deformity.[4] Consequently, a diagnosis of fractured condyle depends on the number of roentgenograms and their quality at the time of occurrence of the fracture. Extensive associated injuries frequently make it difficult to position the injured patient so that roentgenograms of good quality can be made of the condylar region; therefore, it is understandable that some of these fractures may go unnoticed, and for that matter, untreated. Tam[7] reported the case of a 23 year old woman who sustained a bilateral condylar fracture that went unnoticed and untreated for five weeks, when open bite was noted. The condition then was treated conservatively by bringing the teeth into occlusion seven weeks after the accident; occlusion was re-established in one week with elastic traction, and remained good after removal of traction.

In the study by the Chalmers J. Lyons Club, not one case of ankylosis or deformity was noted; conservative methods of treatment were employed in all cases. Seven functional complaints were recorded, but these were painless in nature, and no deformity was recorded. Of the seven, three were associated with

limited lateral excursion to one side and two with deviation to the affected side when the jaw was opened. The sixth patient, who had bilateral condylar fracture, was told by his dentist when he later constructed his denture that the interarch relation was out of line; however, the prosthesis adequately corrected this discrepancy. The seventh patient had full range of mandibular function but complained of painless cracking of one joint when yawning and singing.

In Krømer's series of 154 patients with condylar fracture treated by conservative means, 126 had good results, 11 had limited movement, 2 had trismus, and 1 had ankylosis. In the two cases of trismus, in which injury was due to shell and bomb fragments, the condition was caused by soft-tissue scarring. The one case of bony ankylosis, occurring seven years after treatment, was that of a 12 year old boy who was injured by shell fragments causing fractures of the symphysis and right condyle with a penetrating injury close to the fractured joint. Interdental fixation lasted 35 days; Krømer stated that the injury was treated in 1940 when he had had little experience and that probably he later would have treated the injured condyle by condylectomy and early active movement. He concluded that the best method of treatment for condylar fractures is a conservative closed one even though in most cases surveyed the injury was due to a wartime cause, often an unusual accident, and was attended by unusual complications.

Jacobson,[8] in 1946, made a statistical survey of ankylosis of the temporomandibular joint as seen in a large hospital over a 30 year period. In none of 62 cases was the ankylosis caused by fracture of the condylar process.

In MacLennan's[6] series of 120 traced patients, none experienced ankylosis as determined in 67 by clinical examination and in 53 by correspondence. He stated that the textbook picture of deviation of the jaw on opening and closing was common, but that of 40 tuberculous patients who had no complaints referable to the temporomandibular joint and no history of injury, 29 had deviation on opening and closing of the jaw.

In a comprehensive review of the literature we could find no postoperative survey dealing with a large number of cases of fracture of the condyloid process treated by open operation. The results of such a study would be of interest.

■ *Material*

The case records of 400 patients seen in the 12 year period 1947 through 1958 with a diagnosis of fracture of the maxilla, the mandible or other facial bones were studied. The distribution of patients by site of fracture or fractures is as follows: mandible only, 227; mandibular condyloid process only, 50; mandible, maxilla and other facial bones, 49; alveolar fracture (mandible or maxilla or both), 30; mandible and maxilla, 21; maxilla and other facial bones (excluding mandible), 10; mandible (pathologic fracture), 10; maxilla only, 2, and nasal bones only, 1.

Of the 400 patients, 35 per cent, or 140, had either condylar or subcondylar fractures of the mandibular condyloid process due to some type of trauma, and form the basis of the report to follow. Many of the 140 patients had associated injuries of the jaws and facial bones.

■ *Age and Sex Distribution*

The average age of the patients at the time of injury was 28 years, the youngest being a 3 year old girl and the oldest a 77 year old man. There were 104 males and 36 females, for a ratio of approximately 3:1.

■ *Type of Injury and Site of Fracture*

Automobile accidents accounted for 85 of the injuries, falls for 19, and farm, industrial, airplane and sporting accidents, along with fisticuffs, for the remaining 36. The right condyle was involved in 42 cases, the left in 53, and both in 45.

■ *Associated Fractures*

Ninety of the 140 patients also had an associated fracture or fractures of one or more of the following bones: mandible or maxilla, alveolar process and other facial bones. The remaining 50 patients had only condylar involvement; both sides were affected in 11, the right side in 19, and the left side in 20.

In the 90 patients with associated fractures, the mandible alone was involved in 67 instances. Fifty-seven of these mandibular fractures were of the single variety, occurring most often in the symphysial region or in the body opposite the involved condyle; the other 10 were multiple. The sites of fracture in the remaining 23 patients with associated fractures were as follows: mandible and other facial bones, 12 cases; maxilla only, one; maxilla and other facial bones (excluding mandible), seven; and facial bones (excluding mandible and maxilla), in three instances.

■ *Classification*

An attempt was made to classify the fractures according to the position of the condylar fragment as noted in the roentgenogram taken at the time of accident. However, it is doubtful that any practical classification that would be useful either in selecting the type of treatment or in prognosis can be set forth from a study of these cases. Any classification based on roentgenographic study is subject to gross errors if adequate posteroanterior and lateral roentgenograms of the condylar region are not available. As stated previously, in many instances satisfactory roentgenograms of this region are extremely difficult to obtain in the injured patient. What might appear to be a greenstick fracture of the neck of the mandibular condyloid process on a lateral view may be a 45 degree medial or lateral angulation fracture of the head of the condyloid process. However, we believe that this series of patients represents all types of condylar and subcondylar fractures, ranging from the most simple, namely a greenstick type of fracture without displacement, to the most severe comminuted variety producing deviation of occlusion and open bite.

Adequate preoperative roentgenograms for purposes of classification were available in 114 of the 140 cases. In the remaining 26 cases, however, there was roentgenographic evidence of condyloid-process fractures, so that the fractures could be classified as unilateral or bilateral.

The classification is based on the position of the head of the condyloid process in relation to the glenoid fossa in classes 1 and 2, and on the position of the frac-

Table 1

Roentgenographic classification of condylar fractures (114 cases)

Class	Definition*	Fracture		
		Unilateral	Bilateral†	Bilateral with comminution on one side‡
1	Medial displacement	15	5	1
	Anterior position	8	2½	
	Posterior position	5	½	
2	Lateral displacement	4	2½	
	Anterior position		1	
	Posterior position		1	
3	Medial override	3	3½	
	Anterior position	2	1	
	Posterior position		½	
4	Lateral override	12	8	5
	Anterior position	2	2½	
	Posterior position	14	7½	1
5	Greenstick (no displacement)	9	4½	
	Total	74	40	—

*Classification based on position of head of condyloid process in relation to glenoid fossa (fracture-dislocation) in classes 1 and 2, and on position of fracture ends of neck of condyloid process (displacement) in classes 3, 4 and 5.

†½ represents one side in bilateral type.

‡Included in cases of bilateral fracture. One case of unilateral fracture that was comminuted is included in unilateral group.

ture ends of the neck of the condyloid process in classes 3, 4 and 5 (Table 1). The classification is presented to give the reader a better understanding of the type of condylar fracture with which this series deals, and is not intended to be useful as an aid in determining treatment or in prognosis.

In about 50 per cent of the cases classified, the head of the condyloid process was displaced from the glenoid fossa. In about half the cases of bilateral fracture the head of the condyloid process was displaced on only one side; in the other half the malpositioning of the condylar fragments on one side was almost identical with that on the other. Comminution, however, occurred always on one side only, and all comminuted condylar fractures except one were associated with fracture of the condyle on the contralateral side. No significant finding was noted in the 50 patients that sustained only condylar fractures, that is, those that had no associated fractures; their fractures were caused by the same types of injury as those that prevailed in the other groups, but comminution of the head of the condyloid process occurred in only one instance. The types of fracture represented in the roentgenographic classification can be better understood by referring to the sketches in Figure 1.

■ *Treatment*

No treatment was administered in 13 cases for one or more of the following reasons: (1) fracture of the greenstick variety with minimal displacement, (2) no impairment of occlusion, (3) patient edentulous or young with mixed dentition in whom any abnormality in occlusion

could be compensated for either by construction of artificial dentures or by further eruption of permanent teeth, and (4) patient's delay in seeking professional advice until after fracture site or sites were in the later stages of healing and defects in occlusion were minimal or could be compensated for in some other way.

The remainder of the patients (127) were treated by some means of interdental fixation, so far as the condylar involvement was concerned. In addition, however, 44 of this group required other forms of treatment for associated fractures, such as open reduction, splints with circumferential wiring, and extraoral fixation. Fixation was maintained for an average of 4½ to 5 weeks, varying with age, extent of displacement, and associated fractures. The shortest period of fixation was 12 days, and the longest was 8 weeks. In the 50 patients who sustained fractures of the condyle or condyles only, fixation averaged 17 days when it was used at all.

■ *Results of Follow-up*

The patients included in the follow-up study were treated at the Mayo Clinic for condylar and subcondylar fractures sustained 1½ to 12 years previously, the average being 5.8 years.

RESPONSE TO QUESTIONNAIRE—Ninety of the 140 patients responded to a questionnaire sent them. The results are given in Table 2. Thirty-two patients commented on item 9. Twelve said that the results of treatment were very good to excellent. Most of the remaining 20 patients said they had only minor problems, such as popping of the joint, slight

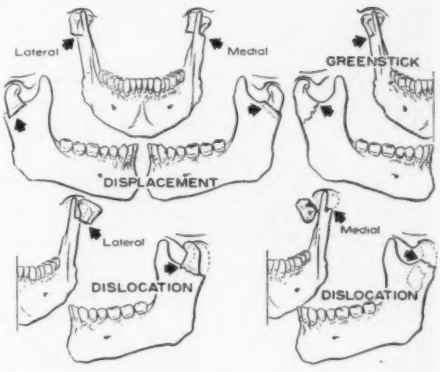

Fig. 1—Diagrams illustrating displacement and dislocation in condylar fractures, and also greenstick fracture of neck of condyloid process without displacement

deviation of the chin on opening the mouth, and occasional pain. A few patients complained of slight paresthesia of the lower lip; however, these patients had associated fractures in the body of the mandible which undoubtedly were responsible for the complaint. Only one patient complained of inability to get food into the mouth. This patient was treated at the age of four years for symphysial, right condylar, and zygomatic-arch fractures, and his case will be discussed later. One patient, who was examined clinically, commented that all mandibular movements were limited slightly but that this limitation did not bother normal eating habits.

ROENTGENOGRAPHIC SURVEY—Condylar and subcondylar follow-up roentgenograms revealed nothing significant in 26 of 45 patients. It was evident in 13 cases that during the healing process a curve, or bulge, developed in the direction of the displaced condylar fragment (Fig. 2). Time, however, appeared to

Table 2

Summary of data on questionnaires returned

Question	Answer		
	Yes	No	Doubtful
1. Do you have any trouble chewing your food?	13	77	
2. Are you able to open and close your mouth normally?	77	13	
3. Do you have any discomfort when yawning?	10	80	
4. Are you able to move your chin forward and backward?	85	4	1
5. Are you able to move your chin from side to side?	85	1	4
6. Do you have any pain or discomfort associated with these movements of the jaw?	9	77	4
7. Do you have any noticeable jaw or face deformity?	17	65	8
8. Would it be possible for you to come to the Mayo Clinic in the near future for an x-ray and clinical examination of your jaws without charge?	59	26	5
9. Other remarks or supplements to the above answers	—	—	—

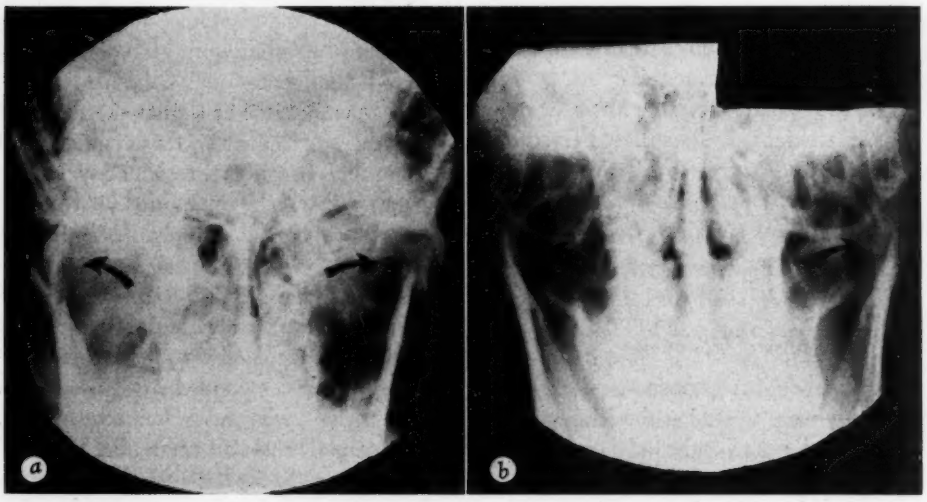

Fig. 2—a: View of 36 year old man showing bilateral condylar fractures. Injury was due to a fall; there were no associated fractures. Arrows point to comminuted fracture on the left and lateral displacement with overriding fragments on the right. Treatment consisted of interdental fixation for 30 days. b: Seven and a half years after injury. Arrows point to slight bulging at sites of condylar fractures. Patient had no complaints and had full range of mandibular movement without pain or other symptoms

have a tendency to correct this type of deformity.

In four cases there appeared to be a re-establishment of the head of the condyloid process from what once was a severely displaced condylar fragment (Fig. 3 and 4). The condylar fragment was completely resorbed in one case, even though function was impaired little, if any. In one instance, fibrous ankylosis

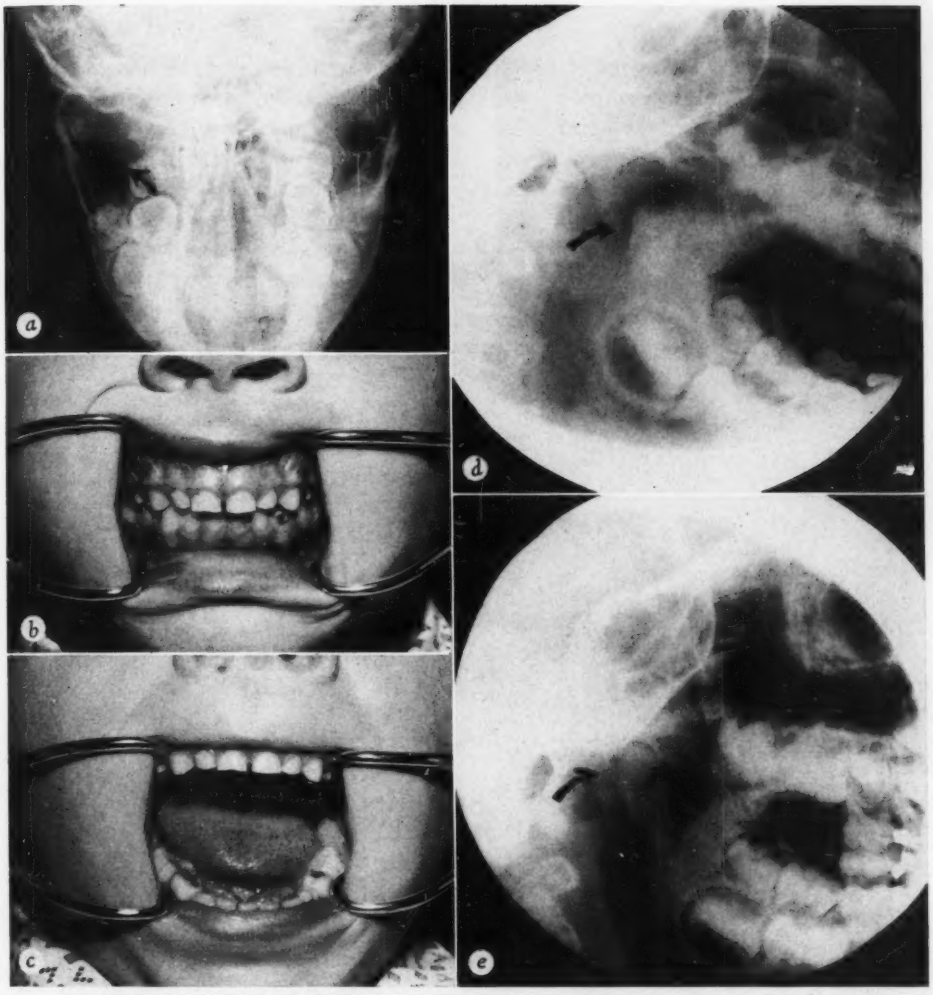

Fig. 3—a: Bilateral condylar fractures in boy, age three. Right condylar fracture was not displaced. Arrow points to medially dislocated head of left condyloid process. b: Occlusion two months after injury. c: View of patient two months after injury. Note slight deviation to left side. d: Left condyle at time of injury. Arrow points to complete medial dislocation of head of condyloid process. e: Head of left condyloid process less than two months after injury. Arrow points to what appears to be new condylar head in process of formation. Note outline of old condylar head still present. See also Figure 4

resulted (Fig. 5); this case will be discussed under "Clinical Findings."

CLINICAL FINDINGS—Four of the 45 patients who were examined clinically had a slight deviation to the side of the involved condyle when opening the jaw. However, this did not interfere with function in any way. Two patients had a noisy (popping) joint; again, this did not inter-

fere with function and was not attended by any type of pain or discomfort. In one instance, all mandibular movement was slightly limited, but function was good in all directions and there was no pain. This patient could open her mouth 28 mm. between the incisal edges of her teeth, whereas opening in the remainder of the group averaged 34 mm. As mentioned previously, there was one instance of almost complete trismus, probably due to fibrous ankylosis.

The other 37 patients had no apparent clinical findings in regard to past condylar or subcondylar fractures. Mandibular function was good in all mandibu-

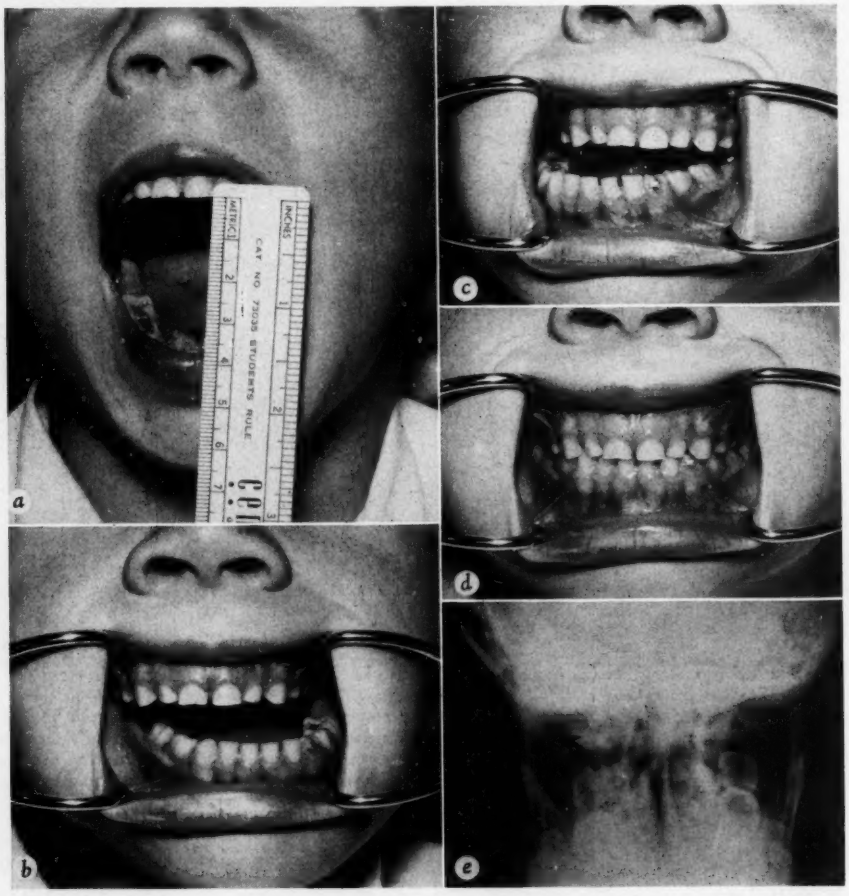

Fig. 4—Same patient as in Figure 3. a to d: Views of child one year after fracture. Jaw opens 36 mm. with ease. Function is without pain and is maximal in all directions. Occlusion is good and there is no deviation on opening the jaw. e: One year after fracture. Arrow points to region of displaced left condyle. Apparently it has been resorbed. Note what appears to be new head of condyloid process

lar excursions, and if the examiner had not known from the record that a condylar fracture had been present at one time he would not have learned it from roentgenographic and clinical examination.

The patient in whom fracture of the right mandibular condyle resulted in almost complete loss of mandibular function is represented in Figure 5. At the age of four years this boy had experienced a right comminuted zygomatic fracture and a fracture of the symphysis in addition to the right condylar fracture with medial displacement from the glenoid fossa. Fixation lasted eight weeks (only because the parents failed to return owing to inclement weather). The boy was seen for follow-up examination ten years after injury. The mother stated that no attempt had been made to encourage him to chew actively after removal of fixation but that he could eat well at first; she also stated that he could not open his jaw as well as he could just prior to the injury. The mother recalled that within the first year after the injury, opening of the lower jaw became more and more restricted, but the child still could eat well, so she did not seek professional advice. Gradually, mandibular movement became more and more restricted until at age eight or nine it reached the stage of almost complete limitation of movement. Because the child still could eat and continued to grow and maintain his weight, no treatment was sought.

As can be noted in Figure 5, the ankylosis probably is fibrous because of the zygomatic fracture, which has healed with excessive callus formation. This excessive callus probably interferes with the coronoid process. The right temporomandibular joint appears to be functional on roentgenographic examination. The patient could open his mouth only 1 cm. between the incisal edges of his teeth but refused further treatment because he was getting along well with eating and could not see the need for further surgical treatment.

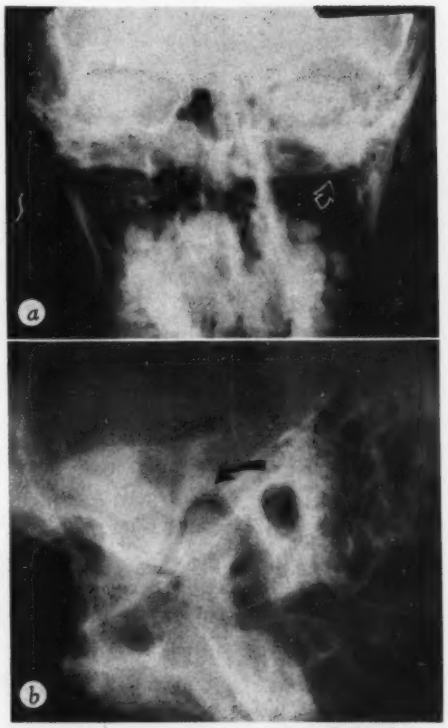

Fig. 5—a: View of 14 year old patient taken 10 years after fracture of right condyle, fracture of body of mandible in symphysis region and comminuted fracture of right zygomatic arch. Arrow points to right coronoid process and excessive callus formation of healed right zygomatic arch. b: View of right temporomandibular joint on same date as in view a, showing what appears to be a normal joint space and healed condyle. Patient could open jaw 1 cm. between incisal edges of anterior teeth

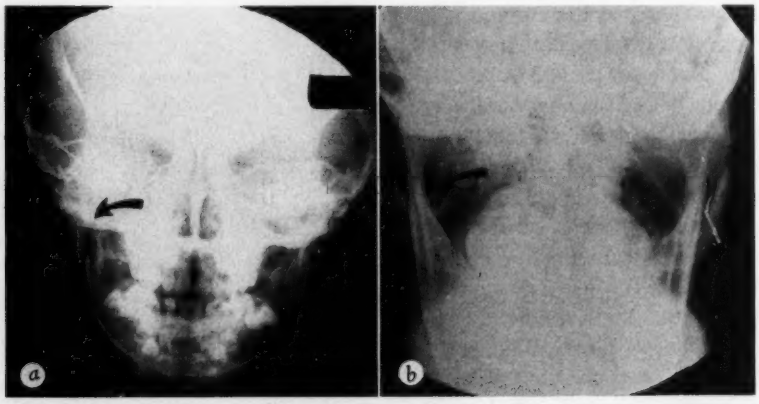

Fig. 6—Case 1. a: Three year old patient with bilateral subcondylar fractures. Arrow indicates severe lateral displacement of neck of condyloid process on left side. b: Seven years later. Arrow points to region injured at time of accident

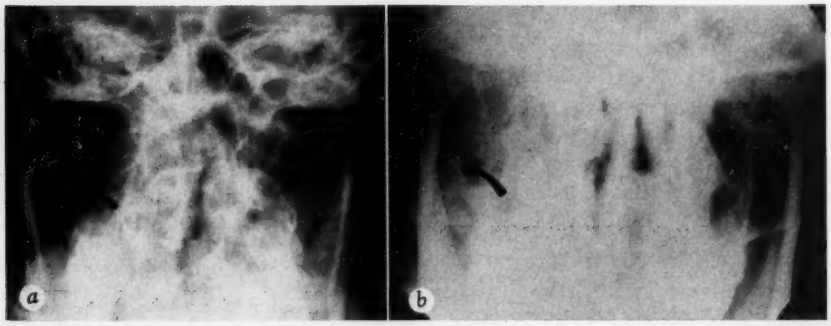

Fig. 7—Case 2. a: Patient, age 18 years, with fractures of left condyle and right angle of mandible, and transverse fracture of maxilla. Arrow points to left condyle which is medially displaced and overriding. b: Three years after injury. Arrow points to site of previous injury

The patient represented in Figures 3 and 4, at age three years, sustained bilateral fractures with dislocation of the head of the left condyloid process to the medial side. Occlusion was good after the injury. The only finding was deviation to the left when the jaw was opened. Treatment consisted of soft diet for two weeks, followed by regular diet for two weeks. At the end of four weeks the child used a jaw-stretching device for one month. Two months after injury the mouth could be opened 33 mm. between the incisal edges of the teeth and, as shown in Figure 3, b and c, two months after injury there was evidence of a new condyle forming and of the old condyle being resorbed (Fig. 3, d and e). At the end of one year

the child could open his mouth 36 mm., and a new condyle apparently had formed (Fig. 4). No roentgenographic evidence of the old displaced head of the condyloid process could be found.

The events concerning the condyle in the preceding case illustrate the law of Wolff; namely, that skeletal bone tends to reshape itself to conform to the forces of stress and function. Of course, in the mature skeleton the regrowth of an entire condyle would not be anticipated; however, apparently a good deal of growth activity does occur in response to man-

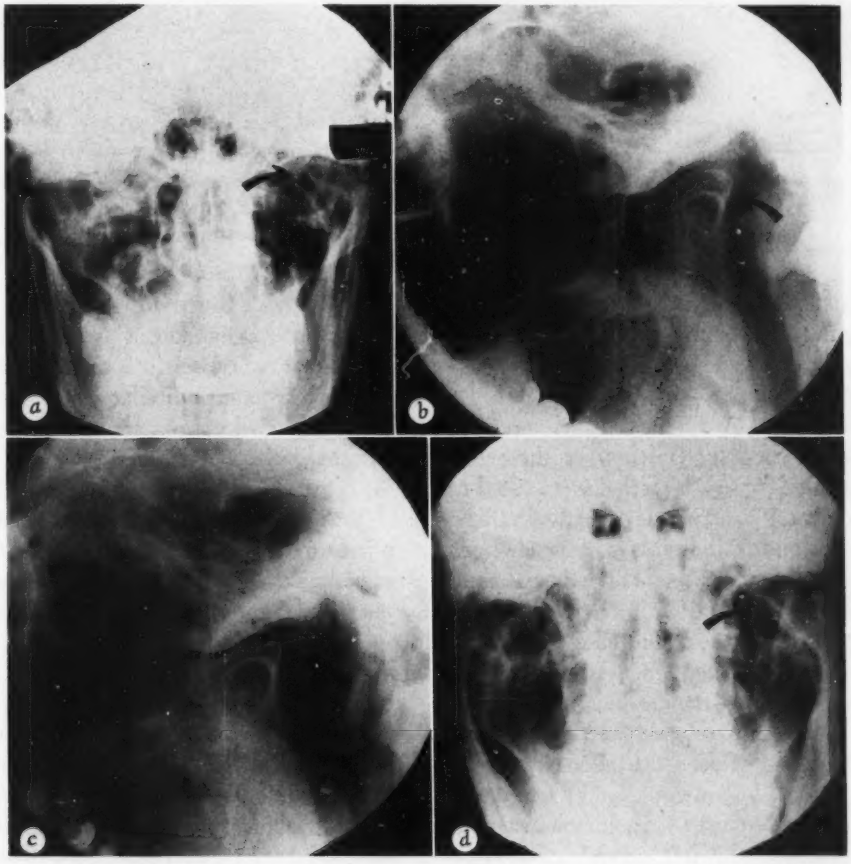

Fig. 8—Case 3. a: View of 32 year old patient showing fracture-dislocation of head of right condyloid process. Arrow points to dislocated head of condyloid process. b: Four years after injury. Note flattened surface of head of condyloid process and outline (arrow) of old displaced original condyle. c: Right condyle, with mandible open to maximal excursion. Note condyle moving out of condylar fossa as compared to appearance in view b. d: Four years after injury. Arrow points to what appears to be part of dislocated condyle as noted in view a. Note apparent formation of new head of condyloid process

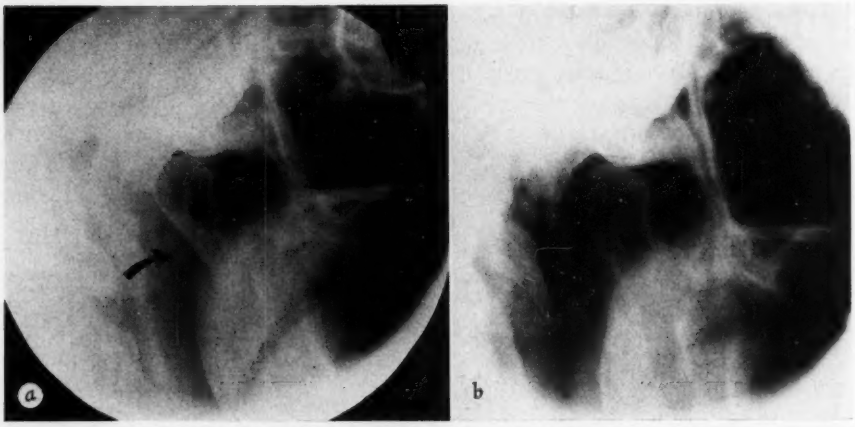

Fig. 9—Case 4. a: View of 40 year old patient showing left condylar fracture with displacement laterally and forward. b: Four years later, part involved is completely healed

dibular function in all age groups. To illustrate and support this point the following cases are reported.

CASE 1—A 3 year old girl sustained bilateral condylar fractures as the result of a fall (Fig. 6). Treatment consisted of interdental fixation for five weeks. The rubber interdental elastics were changed at weekly intervals, and the jaw was allowed to function for brief periods when the elastics were off. On follow-up clinical examination at age ten (Fig. 6) she had a full range of mandibular function and no complaints relative to the temporomandibular joints.

CASE 2—An 18 year old boy sustained fractures of the left condyle and right angle of the mandible as well as a transverse fracture of the maxilla in an automobile accident (Fig. 7). Treatment consisted of interdental fixation and use of cheek wires and a plaster headcap. Fixation was maintained for five weeks. On follow-up examination at age 21 the patient had no complaints relative to his jaw or temporomandibular joint, and his jaw functioned normally in all excursions of mandibular movement.

CASE 3—A 32 year old man sustained a fracture of the right condyle with complete medial displacement of the head of the condyloid process from the glenoid fossa as the result of a fall (Fig. 8, a). Treatment consisted of interdental fixation for a period of 4½ weeks. Interdental elastics were removed at weekly intervals, and the patient was allowed some movement of the jaw for a short time. When seen on follow-up examination four years after injury, he had a full range of mandibular function and no complaints relative to the temporomandibular joint. In the follow-up lateral-view roentgenogram (Fig. 8, b) the head of the condyloid process appears somewhat flattened, but

the view with the mouth open (Fig. 8, c) shows good joint movement out of the glenoid fossa. In the posteroanterior view (Fig. 8, d) it appears that part of the old head of the condyloid process remains on the medial aspect of what seems to be the newly formed condylar surface.

CASE 4—A 40 year old man sustained a fracture of the left condyle as a result of a fisticuff. The neck of the condyloid process was displaced forward (Fig. 9, a). The fragment was laterally displaced. Treatment consisted of denying the patient the use of his dentures and giving a soft diet for four weeks. On follow-up clinical examination four years after injury he still used the same set of dentures and could open his jaw 35 mm. between the incisal edges of his dentures. The follow-up roentgenogram is shown in Figure 9, b.

CASE 5—An edentulous 68 year old man fell from his tractor and suffered bilateral condylar fractures, as well as fracture of the body of the mandible in the symphysial region. The right condyle was displaced and the fragment was overriding to the mesial aspect (Fig. 10, a). Figure 10, b, shows that the left condyle also was fractured and the mandible pulled upward. Treatment consisted of the use of a plaster headcap and cheek wires attached to the maxillary denture, and circumferential wiring of the lower denture to the mandible. Fixation by means of interdenture wires was maintained for four weeks. On clinical and roentgenographic follow-up examination only ten months after injury, it was difficult to determine the sites of previous fracture (Fig. 10, c and d). The patient had new dentures made because, in the course of treatment, the old ones were drilled into to accommodate interdental, cheek and circumferential wires. He had no complaints relative to his temporomandibular joints, ate well, and had a full range of mandibular function.

■ *Summary and Conclusions*

In 400 cases of fracture of the facial bones, mandible or maxilla, there were 140 cases (35 per cent) in which the mandibular condylar process was fractured. These 140 cases form the basis of this report. The ages varied from 3 to 77 years and averaged 28 years. The shortest follow-up period was 10 months and the longest 12 years from the time of injury. The 140 patients all were treated conservatively.

Of the patients examined clinically, the function of the jaw was good in all but two patients. One patient had slightly reduced function in all mandibular movements but had no difficulty in eating and could open the jaw 28 mm. between the incisal edges of her teeth. It was noted that the other patient had greatly reduced function. He was able to open his jaw only 1 cm. between the incisal edges of the anterior teeth. This partial ankylosis was thought to be due to fibrous tissue scarring secondary to a badly comminuted fracture of the zygomatic arch. A few patients complained of noisy or popping temporomandibular joints when eating, occasional pain in the jaw, slight deviation of the mandible when opening, and numbness of the lower lip, but none had difficulty with chewing or eating.

In four cases there appeared to be a

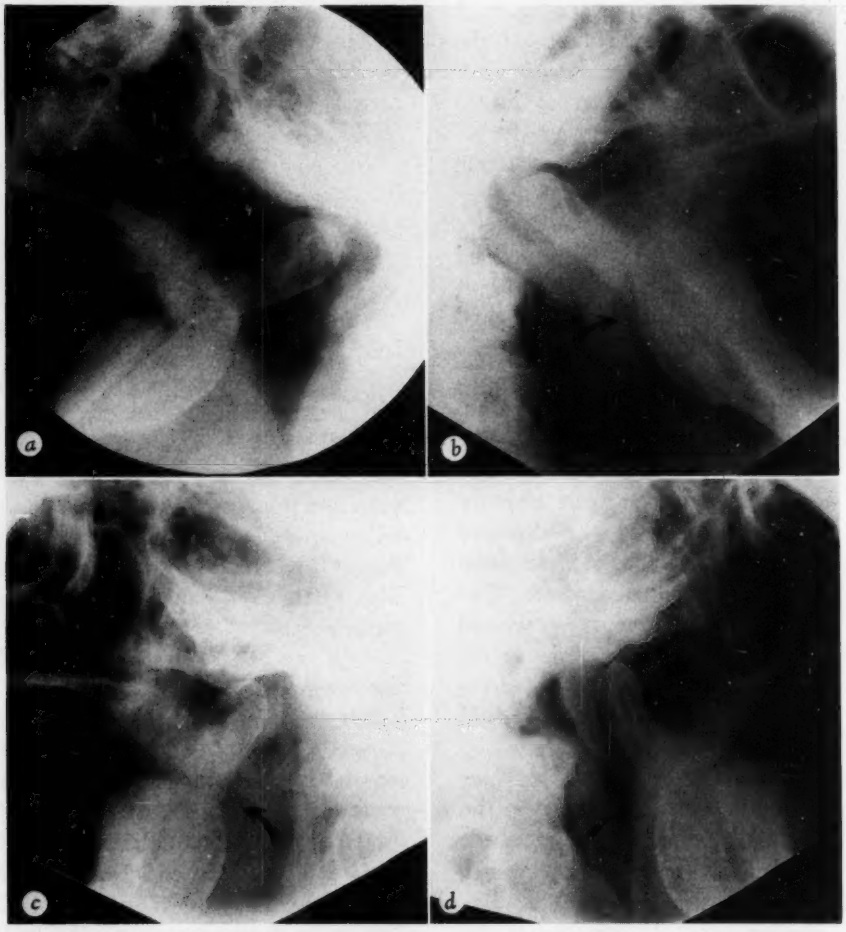

Fig. 10—Case 5. a and b: Views of right and left condyloid processes respectively, at time of injury of patient, age 67. In view a, right condyloid process is displaced medially and is overriding. In view b, condylar fracture is undisplaced, but mandible is pulled superiorly by muscle action. c and d: Right and left condyloid processes ten months later, showing complete healing

re-establishment of the condylar fragment which was severely displaced at the time of injury. One of these cases is documented with roentgenograms and photographs.

The law of Wolff, namely, that skeletal bone tends to reshape itself to conform to the forces of stress and function, is illustrated by five patients ranging in age from 3 to 68 years in whom reshaping of the once badly displaced or comminuted condyle had occurred.

The temporomandibular joint and condyloid process appear to be an unusual

portion of the skeletal system because of their remarkable properties of repair after injury. The conservative approach to treatment of fractures of the condyloid process probably is the one of choice in almost all instances.

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A simplified method for continuously monitoring vital signs

■ *John L. Miller,* D.D.S., Columbus, Ohio*

A continuous check on heart sounds, pulse rate, blood pressure, and apical respirations is a valuable aid to the dental anesthetist while administering halothane or any general anesthetic. A simple, inexpensive device can be fabricated to accomplish this purpose. An esophageal type stethoscope may be of value in obese patients.

Relatively few simple methods have been devised for continuously monitoring a patient's vital signs.[1] An inexpensive auditory monitor has been developed that permits the anesthesiologist to be aware continuously of heart rate, blood pressure, pulse and breath sounds with one ear, while leaving the other ear free to hear operating room discussion.

The secret of good reproduction of sound is a tight-fitting earpiece similar to those found in more expensive hearing aids. An alginate impression is taken of the ear of the person who will use the monitor and a stone model is made. The external auditory canal is blocked with a piece of cotton, the skin of the ear is lubricated. An alginate impression material (Jeltrate) is flowed into the canal and external ear. The impression is removed and invested in a modeling stone to give an exact reproduction of the ear. A personalized clear acrylic ear mold is then processed from the model (Fig. 1, above).

A canal is drilled through the acrylic earpiece using a no. 8 round dental bur. The female part of a metal snap connector is heated and imbedded into the acrylic

resin to connect the earpiece to the rest of the appliance quickly. The male portion of the snap connector is attached to plastic tubing (Baxter Plexitron Administration Set R33A) and the other end of the tubing is connected to a metal three-way stopcock. A no. 8 round dental bur is used again to enlarge the inside diameter of the opening through the metal stopcock. Plastic tubing is then attached to each outlet of the valve and to flat diaphragm stethoscope heads (Fig. 1, below). One lead transmits chest sounds from the point of maximum impulse; the other, vibrations from the brachial artery while the operator takes the patient's blood pressure. The diaphragm head can be firmly attached to the skin of the chest by applying a thin layer of adhesive spray (Vi-Hesive, Aeroplast Corporation) to the chest. Heart sounds, pulse rate and left apical respirations can be monitored continuously while blood pressure can be obtained quickly by turning the three-way

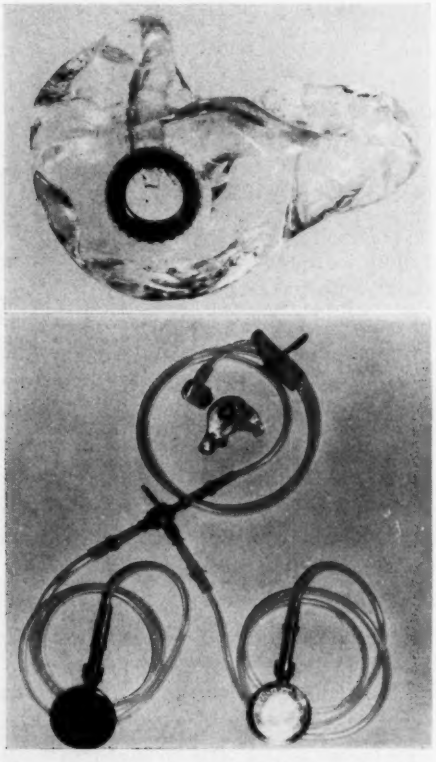

Fig. 1—Above: Personalized clear acrylic earpiece. Below: Completely assembled continuous monitor

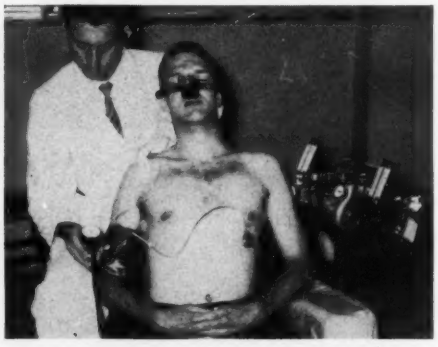

Fig. 2—Continuous auditory monitor in place on a patient

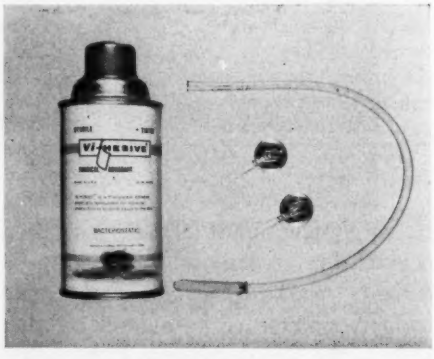

Fig. 3—Accessory attachments showing endoesophageal stethoscope, infant stethoscope heads and Vi-Hesive spray

valve and utilizing the sphygmomonometer (Fig. 2).

Smaller infant stethoscope heads can be constructed inexpensively for the appliance by utilizing the aluminum cover caps from a 40 cc. vial of thiopental sodium.

A mediastinal stethoscope accessory attachment can be fabricated by converting a French urethral catheter (size no. 20 or larger) and attaching a 2 inch length of ¼ inch Penrose drain over the end.[2] The drain end can be cemented or tied with a silk suture to maintain its position (Fig. 3). A Luer-Lok tapered connector is placed in the other end so that the catheter can be connected to the plastic tubing.

Some obese patients do not give satisfactory audible chest sounds. Also, positioning of the patient may dislodge the chest stethoscope. The endoesophageal type stethoscope is used in these instances. It is lubricated and passed into the esophagus after the patient has been intubated. By gentle rotation and adjustment, the maximum intensity of heart and breath sounds can be heard. Advantages of the esophageal lead are that it will not dislodge when the patient is moved and secretions in the tracheobronchial tree can be detected.

With the advent of some of the newer inhalation agents such as halothane, there is an increasing need for the anesthesiologist to be able to detect any signs of cardiac or respiratory variations. This can be done best by monitoring the patient continuously. The safety of the patient is well worth the effort of fabricating and placing a continuous monitor of this type.

*Resident in oral surgery, University Hospital, Ohio State University Health Center.

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■ Nature's Game

In the long run, all human activities are part of a great game with nature—a game in which man makes nature yield the earth's goods to him. Yet men are continually spending a large part of their time in bluffing and fighting one another. Aside from its very real value as part of the fun and spice of life, this kind of activity largely represents time stolen from the game with nature. It results in a low average of efficiency and standard of living for the human race as compared with what we could have if we were more scientific. *Robert S. Mulliken. On the Art of Being a Scientist. I. How a Scientist Thinks. Context 1:14 Spring 1961.*

Importance of visual aids in scientific lectures

■ *Daniel Verne,* D.D.S., and Robert J. Newhouse,† Cleveland*

Not long ago a physician of international fame was asked to present a lecture before a medical society. The topic of his discussion was a disease on which he had done a great amount of research. The famous medical man approached the podium and proceeded to withdraw a ten page lecture from his breast pocket.

This lecturer immediately made his audience restive and annoyed. If he knew more about this disease than any other individual, why did he have to read it?

Too many of our well-informed scientific lecturers speak from prepared papers. The speaker usually starts by stating that he must read it or valuable points may be omitted. This error in lecturing has been passed on to the younger dentist or physician, and so the disease of "paper reading" continues even though a cure exists.[1]

Professional audiences are complaining more and more of the difficulty of understanding what could easily be made clear and of the boredom of trying to follow the unfollowable. Gross damage is done to subject matter highly important by a clumsy way of stating it.[2]

The author[3] of a recent study to determine whether style has an effect on the transmission of information to an audience concluded:

> The use of certain elements of oral style definitely increases the amount of information imparted to an audience when compared to the same speech without these elements of oral style. The superiority of the oral style is present regardless of who delivers it.

The so-called "oral style" is the text and composition of words which are organized to be spoken, not primarily to be printed and read. And here is the crux of the problem; that is, the professional man writes his speech in a reading or literary style and then proceeds to deliver it orally.[4]

The lack of proficiency in speech is probably the weakest point in the educational attainments of the professional graduates. In many instances where there may be intelligence and knowledge, there is an inclination toward mental confusion along with a tendency to remain in timid retirement, all because of a lack of adequate skill and confidence in communication and public discussion.[5]

It is realized that the use of training aids and devices in the audio-visual field cannot displace the rich personality and warmth of a competent lecturer, but it is

also to be realized that everyone does not have the ability to deliver warm, rich, personal lectures. We have not been trained in public speaking and many do not have the scintillating, fascinating personality of a William Jennings Bryan. We must use some other method to keep our audience interested.

Visual education can be the answer to a person not equipped with the ability to remember all facts, figures and statistics. However, such a lecture using "visual education" requires a great deal more preparation than does one not utilizing this medium. A batch of slides cannot be used without organization. The proposed slides should be grouped in a correct relationship, thus making an attractive lecture.[6]

Inasmuch as audio-visual methods encompass the use of lantern slides, strip films, movie films, posters and the use of a blackboard, it will be the purpose of this article to acquaint the reader with aids and methods of lecturing using only the slides and slide machine. Only one facet of the entire field of audio-visual methods will be discussed in this paper.

During the war the United States Armed Forces found that the use of visual aids resulted in a gain of approximately 25 to 35 per cent factual information. There was an increase of approximately 35 per cent in retention of that information over that attained by the traditional methods of instruction.[7]

Visual devices are powerful tools in the hands of an efficient instructor. Words, both written and oral, are often inadequate to convey delicate meanings, understanding, and appreciation to the minds of the audience.[7]

Audio-visual methods are fashionable today. In some instances teachers have not been trained in their use and have never acquired the special skills necessary to use even the simple aids effectively. Many excellent lecturers who have taught and lectured successfully for 20 years without such aids sometimes hesitate to start using them.[6]

■ *Preparation of Slides*

Inasmuch as slides are easily projected, various methods may be used to make them tell an interesting story. First of all the slides should be done in a professional manner. A poor slide should not be included just because it is the only one explaining the point. The use of poor picture quality slides gives the audience the impression that the lecturer does poor work or that he has had only a few of that type of case. Care should be used in photographing all visual aid subject material (Fig. 1, 2). Proper cropping of each subject will insure good illustrations. If slides of type or printing are to be used, the printing should reproduce large enough to be seen in a large lecture hall. It is wise to omit excess printing because the audience does not have time to read every mark.

According to Tribe,[8] most slides should be on the screen for less than a minute, thus should not contain more material than can be absorbed readily in that time. Too many ideas or thoughts should not be combined on one printed lantern slide. Several slides should be used, and each point will become more obvious.

The lecturer errs if he tries to put a complete mouth of periapical roentgenograms on one slide. It is impossible for the

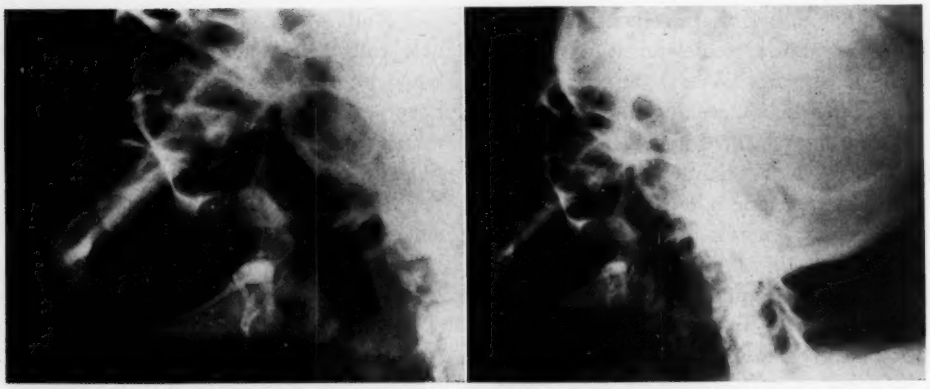

Fig. 1—Roentgenograms should be cropped properly in the slide reproduction so that important areas are clearly defined as in picture at left. View at right demonstrates additional areas that are unimportant

members of the audience to concentrate on one periapical roentgenogram when 14 or 15 are displayed. Members of the audience some distance from the screen will be unable to read periapical roentgenograms effectively if there are too many on one slide.

■ *Graphs*

It must be remembered that slight errors on a slide become greatly magnified when projected on a screen. Therefore it would be wise to letter carefully on a large sheet of paper and have it reduced to slide form photographically. The day and age of complex graphs are gone. The medical lecturer must sum up a table of

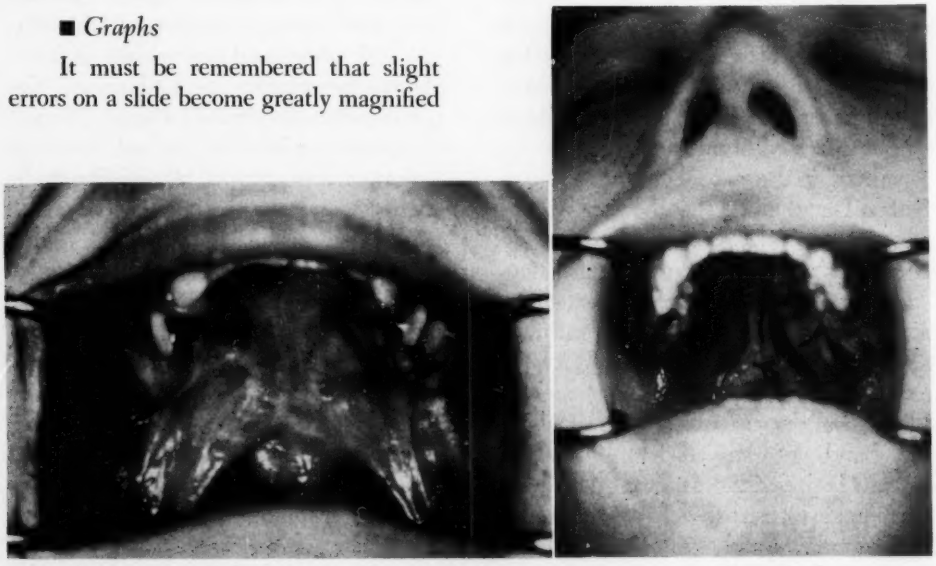

Fig. 2—Correct cropping in picture at left has eliminated unimportant areas of face shown at right

figures and present an interesting point. He must illustrate it with a simple colored line, cartoon or analogous picture. Audiences cannot be impressed with many figures. They cannot possibly read and absorb all of them while the slide is on the screen. The good lecturer takes a complex graph and simplifies it into a few solidly colored columns. He may do this on plain white paper and color them in with crayons or water colors. When making bar graphs, ready-made cellophane tapes of various widths and designs can be purchased which can be cut into any length desired[9] (Fig. 3). This makes for a very neat and professional looking copy which then can be photographed. Tables may be typed but they should not be larger than 4 by 6 inches and should be printed in capital letters. Ruling of these tables is conveniently done with a draftsman's ruling pen rather than with a typewriter. A type style having no serifs on the letters is preferable.[8] Excellent copy can be prepared with a lettering pen and India ink. In making a graph, the curve should be prominent. This can be accomplished by making the line bolder, heavier or colored. Too many intermingled curves are confusing and should be avoided. Points are best rendered as circles, squares or triangles rather than crosses.[8]

No more than eight printed lines should be placed on any data slide and these should fill the entire field. A lesser number is preferable. Typed material is satisfactory, but special handling is necessary. The material to be photographed should be typewritten with a fresh carbon ribbon. A piece of black carbon paper should always be put behind the sheet, facing the sheet of paper. This will give a darker outline to the characters to be photographed. Grid rulings should not intersect lettering or obscure points on a curve.[8]

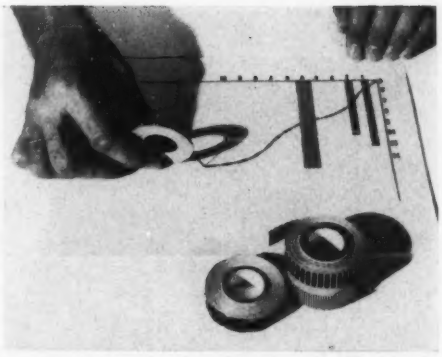

Fig. 3—Prestype numbers are used in constructing a graph in addition to easy roll on A C S tapes for use in bars and lines

Tribe suggests certain rules for making photographs of patients which many times are ignored: (1) Only the essential area is shown (Fig. 4); (2) the subject is arranged in anatomic position if possible; (3) a pleasing plain background of good contrast to the subject should be used; (4) the subject should be illuminated to delineate necessary structures well, without distracting shadows.

Many items can be purchased from the local art store which will aid in the construction of a graph, drawing or diagram. One does not have to be proficient in art to utilize these aids. Transparent, self-adhering, printed acetate sheets of alphabets, numbers, arrows, symbols, borders, screens and shading mediums can be procured. These sheets measure about 10 by 14 inches and each sheet is a complete unit in itself with all letters of the alphabet repeated in the frequency most

Fig. 4—In picture at left, a postoperative view of a patient with prognathism is photographed against a poor background, the ear is not shown and she is wearing jewelry. In picture at right, the viewer can concentrate his attention entirely on patient's face

generally needed, or as in the case of the numbers, arrows, symbols, borders and screens, as much of each as space permits. All sheets are available in black, opaque white or in color[10] (Fig. 5).

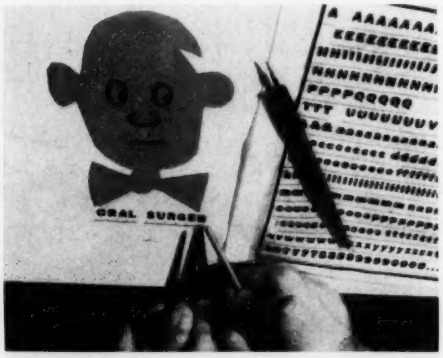

Fig. 5—Artype letters are pressed into place for subtitles

■ *Additional Aids for Slides*

Transparent water colors can be applied to black and white lantern slides to make lines or symbols stand out more clearly. These paints can also be used to tone the entire lantern slide, since a toned background is much easier on the eyes than a black line on a large expanse of white screen. The negative of a black and white line copy can be mounted as a reverse copy lantern slide so that instead of the lines being black on white, it will be a complete black background with white lines again making it easier to view. All or partial toning of the reversal copy can be done.

Roentgenograms can be made more glamorous by making black and white prints of the pertinent points of the film. On this black and white positive print a

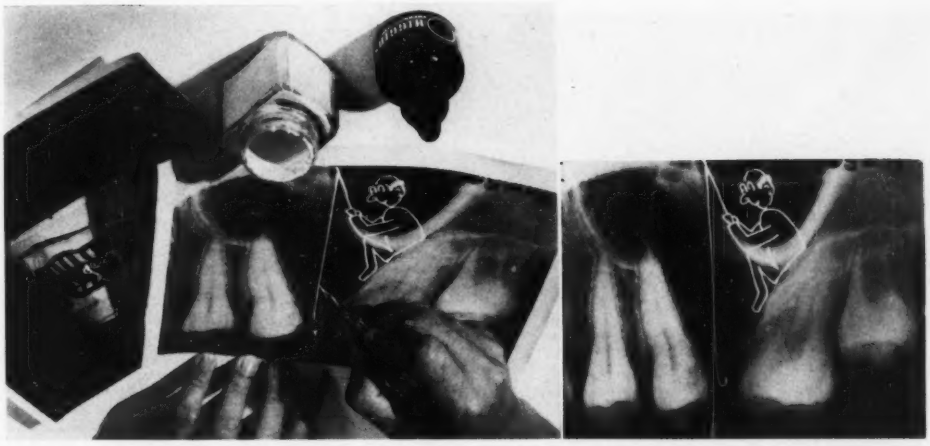

Fig. 6—Cartoon figures are drawn on a print of a roentgenogram as in view at left and rephotographed to construct a 35 mm. slide. Picture at right is finished product

cartoon can be drawn. The little figures can be drawn to point out an important area. Black India ink or white ink can be used. The print is then photographed again and then made into a slide for projection (Fig. 6).

Kodachrome slides can have symbols, arrows, lines or cartoons superimposed on them so that the drawing will appear to be part of the original Kodachrome. This type of slide is useful in pointing out areas not easily discernible on the Kodachrome slide.

The Kodachrome slide is projected on a white sheet of paper. The paper must be large enough to include all the corners and edges of the projected Kodachrome image. The drawing is made on the paper being careful to end arrows or lines at an exact point. The edges of the Kodachrome image are also outlined on the paper. These edge lines are used later as a reference point for the photographer. He will be able to reduce the size of the drawing to the exact size of the Kodachrome slide.

The line drawing made on white paper is photographed on Kodalith film to the exact size of the Kodachrome. A contact reversal print on Kodalith film is then made. This clear transparency with the black line drawing is placed over the Kodachrome transparency in the position desired. They are united by a suitable thin tape and placed between two cover glasses. The two glass covers are taped together and the slide is ready for showing. It is impossible for the audience to realize that there are actually two transparencies being shown (Fig. 7).

Certain lectures require many slides to illustrate a series of ideas. These ideas should be made simple. In many instances, the lecturer is pressed for time. The purchase of a pack of construction paper is the answer. Such a lecture can be produced in one evening at home with an ordinary home scissors. This construction paper comes in a variety of colors. It

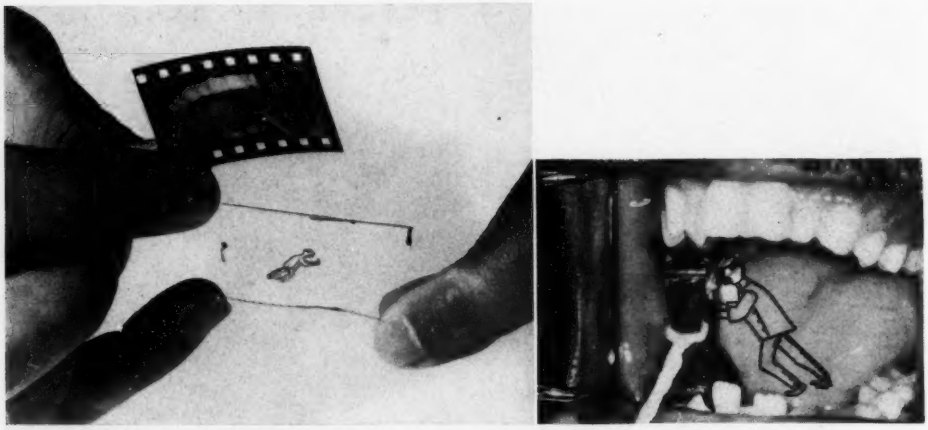

Fig. 7—Cartoon figure has been photographed on clear acetate and then placed over a Kodachrome transparency as shown at left. In finished slide it appears as if the figure is part of the Kodachrome as shown at right

is a simple matter to cut out a variety of shapes, sizes, and grotesque figures. A three-dimensional effect can be obtained by using a solid object along with the cutouts. For example . . . if you wish to convey the idea that a drug should be given intramuscularly, a cutout should be made of an arm and then an actual syringe with a needle attached should be placed in it. This picture can be photographed and made into a slide (Fig. 8, left). These cutouts should not be made anatomically perfect. In fact, they should be somewhat overdone to attract attention.[11]

Certainly a little imagination in this field of visual education and in the making of slides is better than copying pictures out of textbooks. (Fig. 8, right). These pictures when photographed out of the books usually contain extraneous material in which the audience has no interest. Many times the pictures that are photographed from books have extra lines, extra definitions, all placed to confuse the lecturer and his audience. It must be remembered that each slide must stand for something unlike that for which any other slide has stood. It must be something definite and something important. The pictures must be fitted into one speech plan and not the speech plan into the pictures. The nature of the comment on each slide must be planned ahead of time, proportioning both the nature and the length of the comment to the importance or complexity of the picture. The slides must be checked and rechecked before each lecture.

■ *Binding of Slides*

The lecturer can bind his own slides. The film is removed from the cardboard mounts and brushed lightly with a large camel's hair brush. They are then placed in silver masks. Clean glass slides are placed on either side and the edges taped with a pressure sensitive binding tape. It

Fig. 8—Examples of slides using cutouts and actual objects

should always be remembered that the side with the emulsion or the dull side is placed away from the light source of the projector.

■ *Comment*

The use of too many models, photographs or roentgenograms on the screen at any one time causes none of the objects to show up well.[12] When the audience is looking at a picture, it is thinking only of that picture and is mentally prepared to assimilate only that which is strictly relevant to that picture. Hence any additional model or photograph will not only be wasted but will tend to subtract from the desired effect.

These are just a few of the many ways a professional lecture can be enlivened through the use of visual aids. A little imagination and a small expenditure in time and effort will yield large returns in helping audiences to understand, absorb, and retain the material presented.—*10900 Carnegie Avenue.*

*Chief, department of oral surgery, Mount Sinai Hospital, Cleveland.

†Head of photography department, Mount Sinai Hospital.

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■ GENIUS

Genius, in truth, means little more than the faculty of perceiving in an unhabitual way.—*William James.*

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Diphenhydramine hydrochloride used as a local anesthetic for tooth removal: *report of case*

■ *James R. Smith,* D.D.S., U. S. Air Force*

A review of the literature has failed to reveal an instance in which diphenhydramine hydrochloride has been used successfully as a local anesthetic agent in oral surgery. It has been established that this drug possesses anesthetic properties.[1] On advice of the chief of the dermatology service at the 5040th USAF Hospital, I have used it in the form of an elixir mixed with equal parts water as a mouth rinse before meals, after meals and before retiring in instances of primary herpetic stomatitis for its local anesthetic action with excellent results. The case reported here is interesting because it is believed to be the first on record in which diphenhydramine was used successfully as a local anesthetic for tooth removal.

HISTORY—A 23 year old white woman reported to the dental service of the 5040th USAF Hospital on August 18, 1960, complaining of pain in the maxillary left third molar region. Examination revealed a pericoronitis about the unerupted maxillary left third molar. In obtaining a routine history, the patient stated that she was allergic to lidocaine, procaine, propoxycaine and metabutethamine. The remaining history was not significant, and the patient was referred to the dermatology service on August 19 for evaluation of her stated allergies.

She was seen on consultation September 7. The following report was rendered: "The patient has developed hives in the past after administration of procaine, and generalized swelling after the use of propoxycaine. She has not developed itching or swelling after the use of lidocaine, but has fainted at times after its use.

"The patient was treated intradermally, using 1 per cent procaine and 1 per cent lidocaine, and immediately developed a flare and wheal. No propoxycaine or metabutethamine is available for testing with these.

"The impression is that the patient has an allergy to local anesthetics—procaine and lidocaine. The recommendation is for the use of general anesthesia."

The patient was referred to the oral surgery service for further treatment.

Additional questioning at that time revealed no abnormal history other than what had already been determined. The patient was advised of the established policy that all patients requiring general anesthesia must be admitted to the hospital. She did not desire to spend the time involved for such a short procedure if any other means could be used. I explained that diphenhydramine hydrochloride was an antiallergic drug, that it possessed anesthetic properties and might be used successfully as a local anesthetic agent to remove her offending tooth. The patient said that she was not "afraid of needles" and that she would like to try the diphenhydramine.

PHYSICAL EXAMINATION — The general physical examination revealed a healthy looking, well-developed woman in no distress with no abnormalities noted. She was very alert and cooperative. The oral examination revealed a normal occlusion with the teeth in a good state of repair. The soft tissues appeared normal in color and consistency. Both maxillary third molars were missing along with the mandibular left third molar and mandibular right second molar. There was a bulge with tenderness on palpation of the maxillary left third molar region.

ROENTGENOGRAPHIC EXAMINATION — A periapical view of the maxillary left third molar region revealed an erupting, slightly impacted third molar with some radiolucency about the crown.

TREATMENT—The area around the offending tooth was dried and prepared with an antiseptic agent, then 1.5 cc. of 10 mg. per cubic centimeter solution of diphenhydramine hydrochloride (Benadryl) was infiltrated about the maxillary left third molar region. After one and a half minutes, the patient began to "feel a numbness in the area." Normal testing procedure was used to determine the quality of anesthesia which appeared to be profound within five minutes, but in an effort to be positive, the tooth was not removed until eight minutes after the injection of diphenhydramine. At this time a V-shaped piece of soft tissue was removed distal to the maxillary left second molar without evidence of pain. The buccal gingival tissue was slightly elevated, and the tooth was removed without difficulty, using a simple elevator technic. Two no. 00 black silk sutures were inserted along with a gauze pressure pack. The patient said that she experienced no pain during the procedure and left the clinic satisfied and in good condition.

POSTOPERATIVE COURSE — The patient's postoperative course was uneventful with normal healing of the tissues and no evidence of sloughing and ulceration at the sites of injection. The duration of anesthesia was not determined because the patient fell into what she described as a "very restful sleep" for four or five hours after she arrived home. She also stated that there were no undesirable postoperative reactions to the drug used.

SUMMARY AND CONCLUSIONS—A case is reported in which a patient, with a proved allergy to most local anesthetic drugs, had a tooth removed successfully using diphenhydramine hydrochloride as the anesthetic drug. Diphenhydramine might be used when the patient is sensitive to most local anesthetic drugs and is undergoing a surgical procedure of minor significance, or especially when the sensitive patient also happens to be a poor risk for general anesthesia. Further study and evaluation may prove valuable.

The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Department of the Air Force or the Air Service at large.

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■ IMPORTANCE OF IMPRACTICALITY

Impracticality is more generally important than we are inclined to suppose.—*Warren Weaver, The Mathematical Theory of Communication.*

Hypertrophy of the mandibular condyle: *report of case*

■ *Henry C. Thompson,* D.D.S., M.S., Fort Hood, Texas*

Hypertrophy of the condyloid process of the mandible is a benign process of obscure origin which produces deformity and asymmetry of the mandible as well as functional disturbances. In most cases there is malocclusion, enlargement of the head of the condyloid process, elongation of the ascending ramus of the mandible which lowers the angle of the jaw and shifts the symphysis toward the unaffected side, resulting in facial asymmetry and deformity.[1-8] A method of treatment in these cases is condylectomy to improve facial symmetry.[9-12]

This case is of interest since there was clinical evidence of skeletal and soft tissue hypertrophy of the whole left side of the face in addition to the condyloid process and ramus of the mandible.

REPORT OF CASE—The patient was a 23 year old Private First Class, who was admitted to Walter Reed Army Hospital on June 24, 1954 from Tokyo Army Hospital with a transfer diagnosis of ossifying fibroma of the left temporomandibular joint. He complained of pain and deafness in the left ear and pain in the left temporomandibular joint.

HISTORY OF PRESENT ILLNESS—According to the history elicited from the patient, he had been injured by a grenade explosion in Korea on June 2, 1953. He sustained a contusion of the left arm, but he stated there was no external evidence of trauma, ecchymosis, swelling or tenderness of his face. After this explosion, however, he noted an enlargement of the left side of the face, which was progressive. In November 1953, he noticed that his right molars made interceptive contact; this condition prompted dental examination. His remaining teeth were extracted for other reasons, and complete dentures were constructed. He discarded these dentures because of discomfort and inability to masticate his food properly.

In January 1954 he developed pain on opening and closing his jaw. This pain seemed to radiate from the left temporomandibular joint. He also noticed a slowly progressive loss of hearing in his left ear. On May 5 he sought treatment at the 121st Evacuation Hospital in Korea because of these symptoms. Examination revealed a complete deafness of the left ear due to the loss of air conduction, and he was transferred to Tokyo Army Hospital on May 9 with the diagnosis of ossifying fibroma of the left temporomandibular joint. Biopsy specimens were taken from the left bicuspid alveolar ridge and tongue on May 18. According to the pathology report, the osteogenesis observed in the alveolar biopsy specimen was thought to be due to the healing process after the extraction of the teeth. The tongue biopsy was reported as normal. He was evacuated to Walter Reed Army Hospital for further definitive diagnostic studies and treatment.

PAST HISTORY—The past history was significant only as to the injury sustained in the grenade explosion on June 2, 1953. There was no familial history of unilateral hypertrophy of the face.

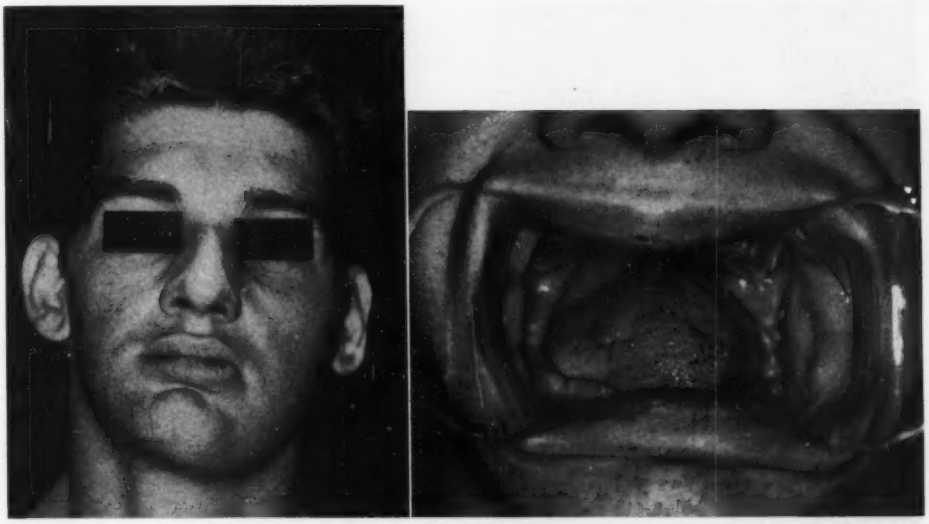

Fig. 1—Left: Preoperative view showing clinical appearance of patient. Note apparent hypertrophy of left side of lower lip and left side of mandible from symphysis to temporomandibular joint region. Right: Intraoral view illustrating unilateral enlargement of left side of tongue

PHYSICAL EXAMINATION—Examination on admission revealed a well-developed, well-nourished 6 foot 2 inch, 175 pound, white soldier whose blood pressure was 135/75. He had an apparent enlargement of the left side of the mandible from the symphysis to the temporomandibular joint (Fig. 1, left). The head of the left condyloid process was prominent, and the left angle was lower than the right. The left side of the lip and tongue appeared enlarged (Fig. 1, right). Intraoral examination revealed the patient to be edentulous with increased denture space on the left. Examination of the external auditory meatus revealed the orifice to be almost completely occluded. Mandibular opening was restricted and accompanied by pain. The mandible deviated to the left on opening. There was no cranial nerve involvement except the acoustic division of the eighth nerve.

LABORATORY DATA — Hematologic study revealed a white blood cell count of 7,200 per cubic millimeter with a differential count of 55 per cent neutrophils, 40 per cent lymphocytes, 4 per cent monocytes and 1 per cent eosinophils. Hemoglobin was 17.1 Gm. per hundred millimeters and the hematocrit was 50 per cent. Urinalysis revealed a trace of albumin. The cardiolipin microflocculation test was negative. Blood chemistry examination revealed a serum calcium of 5.4 milliequivalents per liter, inorganic phosphorus 3.6 mg. per hundred milliliters, acid phosphatase 0.7 units, and alkaline phosphatase 7.3 Bodansky units.

Examination of the skull in multiple roentgenographic projections including posteroanterior (Fig. 2), anteroposterior, lateral head, Towne and modified Towne views disclosed gross enlargement of the left condyloid process and ramus of the mandible. The sella turcica and associated structures were within normal limits. Preoperative cephalometric and temporomandibular joint roentgenographic examination revealed the left glenoid fossa to be twice the normal size and the left angle of the mandible to be 14 to 16 mm. lower than the right angle. A sinus survey was negative. Roentgenographic examination of the chest was within normal limits.

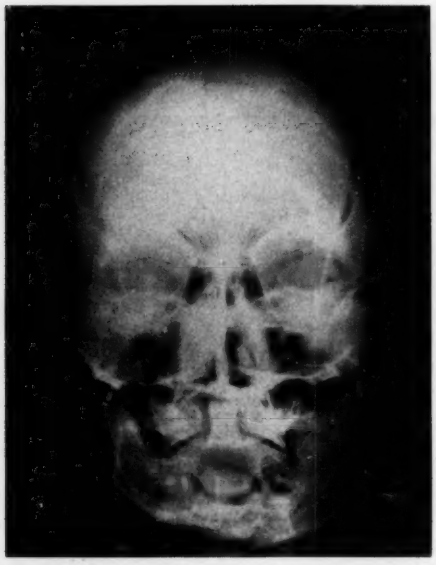

Fig. 2—Posteroanterior view of head reveals thickening of condyloid process and left ramus. Note that left angle and body of mandible are depressed because of this hypertrophy

COURSE IN HOSPITAL—On July 3 a biopsy specimen of the left mandibular alveolar bone, left mandibular tuberosity and internal oblique line was taken for histopathological examination. Consultation with the otorhinolaryngological service on July 3 revealed that the left auditory canal was obscured by a hard, smooth obstruction at the orifice. On July 9 the hospital tumor board concurred in the recommendation of a left condylectomy to improve appearance and function and for biopsy. Neurosurgical consultation on July 14 revealed the only cranial nerve involvement to be the acoustic division of the eighth nerve, probably due to bony encroachment.

On July 15 with anesthesia induced by thiopental sodium administered intravenously and supplemented by nitrous oxide and oxygen supplied by means of an endotracheal tube, the head was turned to the right, and the left side of the face and neck was prepared with pHisoHex. The head was draped in a manner so as to expose the left side mandible and neck.

A 3 inch submandibular curvilinear incision was made around the angle 1 cm. below the inferior border through the skin and subcutaneous tissue. Hemostasis was obtained. The platysma muscle was divided sharply, and the marginal mandibular branch of the facial nerve was identified and reflected. The deeper tissues were bluntly divided down to the inferior border of the mandible, and the anterior facial vein and external maxillary artery were identified and retracted. The periosteum along the inferior border of the mandible was sharply divided, and the periosteum and masseter muscle attachment were reflected off the lateral aspect of the ramus. Elevation of soft tissues was carried superiorly until the condyloid process was exposed. With the use of a no. 14 surgical bur in a dental handpiece, drill holes were placed about 1 mm. apart from the sigmoid notch posteriorly to the posterior border of the ramus. These drill holes were joined by using a Stout chisel and surgical mallet, thus separating the condyle from the ramus. The condyle was rotated with Kocher forceps, and the ligaments were sharply detached. The condyle was removed and sent to the laboratory for histopathological examination.

Three pieces of Gelfoam were placed in the joint defect to help control bleeding. The reflected tissues were replaced, and the periosteum was reapproximated using interrupted no. 00 plain catgut sutures. The deeper tissues were sutured in layers. A split Penrose rubber

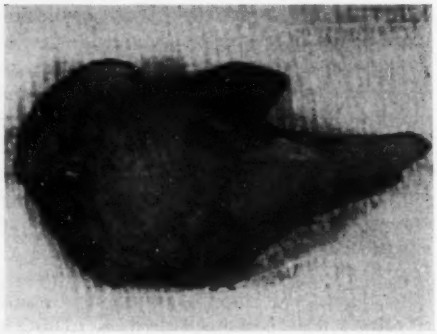

Fig. 3—Removed condyle. Note extent of enlargement

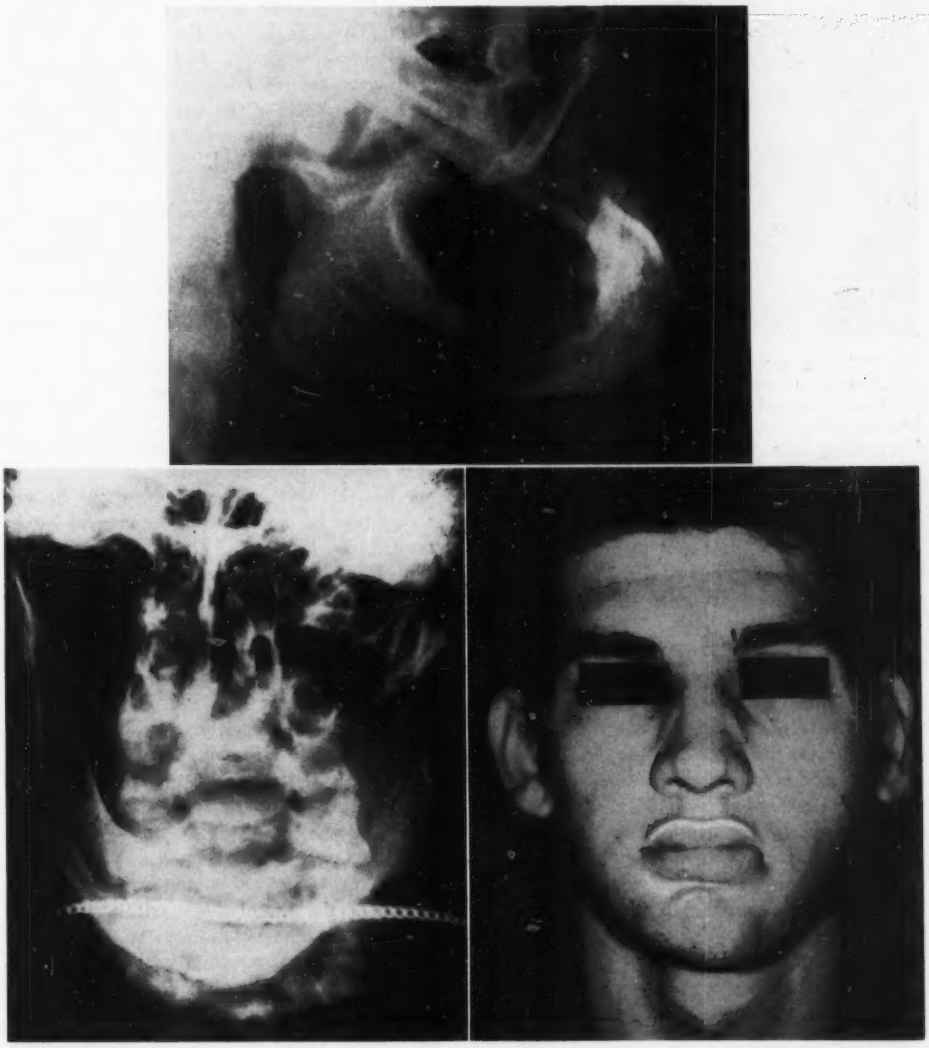

Fig. 4—Above: Postoperative lateral view of left side of mandible revealing extent of condylectomy. Below left: Postoperative posteroanterior view reveals angles of mandible to be almost parallel. Below right: Postoperative view taken at time of discharge showing improvement in facial symmetry

drain was placed, and the skin was closed by interrupted no. 0000 silk sutures. The wound was covered with a large semipressure dressing, and the patient was sent to the recovery ward in good condition.

Penicillin, 600,000 units, was given daily for five days, and 50 mg. meperidine hydrochloride was given every four hours for pain as needed. The postoperative course was uneventful except for a slight weakness of the

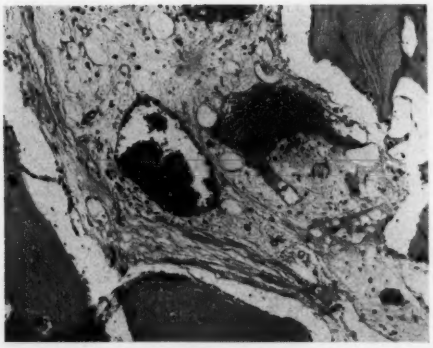

Fig. 5—Biopsy specimen of condyle July 28, 1954 reveals orderly trabeculae with medullary spaces filled with normal fatty marrow. A few vague hints of possible telangiectatic channels are seen, but nothing clear cut is apparent

left marginal mandibular branch of the facial nerve. The patient was sent to physical medicine section for stimulation of this nerve. The patient was discharged from the hospital on August 15.

PATHOLOGICAL REPORTS—Histopathological examination of bone July 3, 1954 revealed normal bone with minimal fibrosis.

Gross examination on July 28 revealed that the left condyle measured 2 cm. in diameter, 8 mm. in thickness and 3.5 cm. in length. The cortex was 1 mm. thick. No unusual gross features were present except for the size (Fig. 3). Microscopic examination revealed bone in which the lamellae were quite regular. The medullary area was filled with normal fatty marrow. The bony trabeculae were orderly. The diagnosis was hypertrophy, left condyle of the mandible.

FOLLOW-UP EXAMINATION—Follow-up examination performed on October 4 revealed no further progress of the hypertrophy. The maxillary and mandibular dentures had been furnished and were found to be serviceable. Lateral roentgenographic view of the left side of the mandible revealed the absence of the condyle (Fig. 4, above). Cephalometric roentgenograms revealed the left angle to be on the same level as that on the right (Fig. 4, below left). The left side of the lower lip showed no residual weakness. His facial appearance and symmetry were improved; however, there was still fullness of the left side of the tongue and lip (Fig. 4, below right). Function of the mandible was improved.

DISCUSSION—Hypertrophy of the mandibular condyloid process is rare. The etiology is unknown, and the diagnosis is made from clinical, roentgenographic and histopathological examination. From a clinical aspect this patient appeared to have a unilateral hypertrophy of the left side of the face including the side of the tongue, lower lip, zygomatic arch and mandible. Roentgenographic examination revealed a hypertrophy of the left condyle which gave this clinical appearance. The enlargement of the left side of the tongue and of the lip was thought to be a part of the process of hypertrophy.

The diagnosis was established through a review of the patient's history, physical examination, roentgenographic evaluation, laboratory studies and microscopic examination of the removed condyle. The progress of the hypertrophy may not have been retarded by the surgical procedure performed; however, mandibular function was improved as well as facial symmetry, the temporomandibular joint pain was relieved, and pertinent tissue was provided for histopathological examination (Fig. 5).

According to Johnson[13] the hemihypertrophy can be related to the angiomatous-like ectasia of the vascular bed within the bone. Such ectasias can be induced or activated by trauma, even trauma of a concussive nature. This pattern is seen most frequently in connection with mild trauma to the outer end of the clavicle (as in bumping the shoulder when going through a doorway) followed by a vascular ectasia about the outer end of the clavicle with resorption of the distal end. In instances such as this the ectasia is a great deal more severe and produces an osteoclastic response with bone destruction. With milder forms of ectasia, the increased circulation merely suffices to step up the metabolic rate and lead to overgrowth of the region.

*Lieutenant colonel, U. S. Army; chief, oral surgery, U. S. Army Dental Detachment.

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Carcinoma of the gallbladder with mandibular metastasis: *report of case*

■ *C. Jules Rominger,* M.D.; David W. Lockwood,† and Christopher W. Canino,‡ Philadelphia*

Metastatic malignancy of the mandible is rare. In 1954 one of us (C.J.R.) reviewed the world literature and added additional cases.[1] Many sites of origin were noted but no cases of cancer of the gallbladder were included. It is our purpose to report the first case of mandibular metastasis from gallbladder carcinoma.

REPORT OF CASE—A 68 year old white married woman was admitted to Misericordia Hospital in October 1959. From 1952 to 1959 the patient had had episodes of right upper abdominal pain. Cholecystography revealed radiolucent calculi in the gallbladder (Fig. 1, left).

In October 1959 the patient was admitted with more severe, constant upper abdominal pain. The patient had a palpable right upper abdominal mass, and the liver edge was felt 7 cm. below the costal margin. Roentgenographic study of the colon was negative but gallbladder calculi and a large surrounding soft tissue mass were visualized. The chest roentgenogram was negative. The preoperative hemogram showed a hemoglobin of 81 per cent and a white blood cell count of 8,150 per cubic millimeter.

At operation on October 24 the right lobe of the liver was noted to be enlarged and invaded by a large, hard, mottled, grayish-red mass. The tumor involved about one third of the right lobe of the liver and extended downward to the gallbladder. The stomach, duodenum, pancreas, small and large bowel, uterus, fallopian tubes and ovaries all were normal. Although the tumor was confined to the gallbladder and adjacent liver, it was considered inoperable. A biopsy of the tumor in the liver was performed. A histopathologic diagnosis of metastatic adenocarcinoma supported the operative diagnosis of metastatic carcinoma of the gallbladder (Fig. 1, right). The patient's postoperative course was uneventful and she was discharged on November 3.

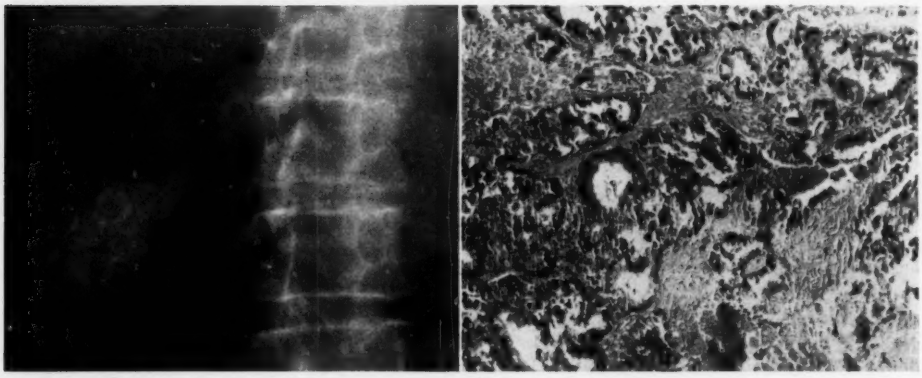

Fig. 1—Left: Cholecystogram in 1957 showing multiple gallstones. Right: Biopsy specimen of hepatic metastatic lesion showing adenocarcinoma. Note similarity to lesion of mandible in Figure 2, below right

In April 1960 she developed headache and pain in the posterior part of the neck and left side of the mandible. A swelling developed in the left angle of the mandible and gradually increased in size (Fig. 2, above left). On May 24 it measured 3.5 by 6 cm. Roentgenograms of the mandible showed an osteolytic lesion at the angle of the mandible measuring 2.5 by 4 cm. eroding the cortex (Fig. 2, above right and below left).

Radiation therapy was administered between May 27 and June 9. A tumor dose of 1,800 r was achieved using moderate voltage roentgen therapy. The swelling diminished, and by June 24 the patient had no facial pain.

During this time the patient's liver was enlarged to the umbilical level. Her general condition gradually deteriorated. A course of 45 mg. of Thio-Tepa (triethylenethiophosphoramide) between June 29 and July 8 was to no avail, and she died on July 18.

Autopsy permission was not granted, but aspiration of the mandible was allowed. The specimen showed adenocarcinoma of the same variety previously noted in the liver biopsy (Fig. 2, below right). The final diagnosis was carcinoma of the gallbladder with hepatic and mandibular metastasis.

DISCUSSION—Awareness of the possibility of mandibular metastasis and watchfulness for the symptoms of facial pain, toothache, loose teeth, swelling of the jaw and paresthesia or anesthesia along the course of the inferior alveolar nerve in patients with advanced malignancy will result in more diagnoses of this entity. Since our review of the literature in 1954,[1] we personally have observed five additional cases of mandibular metastasis including the present case (one malignant melanoma, one carcinoma of the lung and two carcinomas of the breast). Others have reported a few additional cases.[2-6]

Of prime importance is the distinction between primary mandibular lesions and metastatic malignancy in solitary lesions. A history of previous malignancy is of great aid in establishing a diagnosis of metastatic tumor. However, unless the mandibular lesion is obviously part of a disseminated metastatic process, biopsy should be done to exclude the possibility of a second primary lesion.

The treatment of metastatic lesions of the mandible is palliative, and considerable pain relief can be attained by judicious use of roentgen therapy.

SUMMARY—The first reported case of carcinoma of the gallbladder with mandibular metastasis is presented.

These rare metastatic lesions should be distinguished from primary lesions.

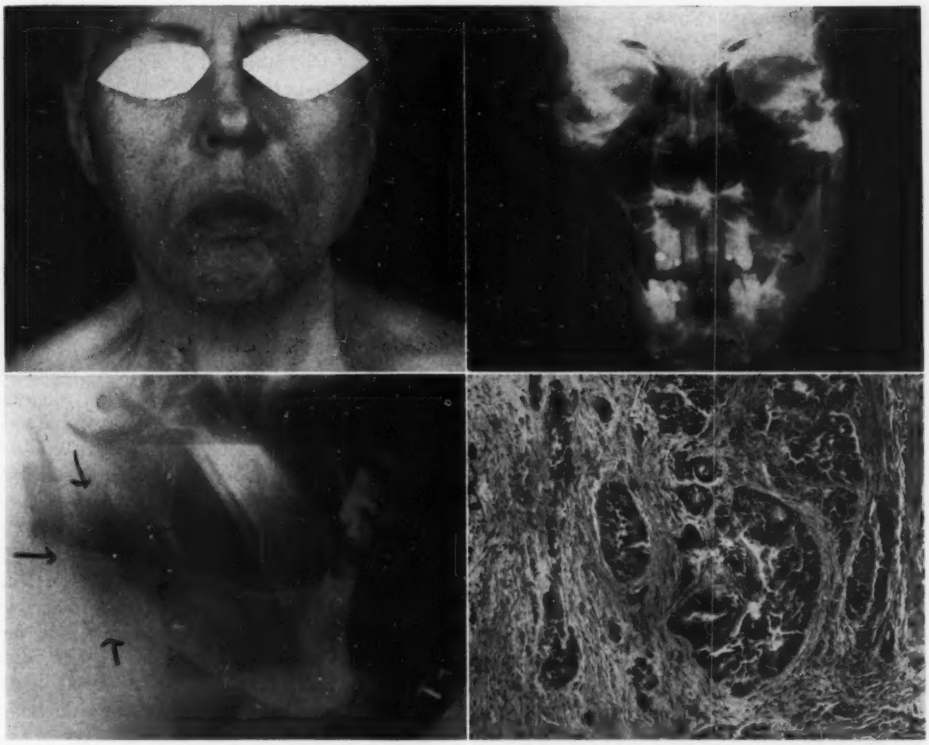

Fig. 2—Above left: View of patient showing swelling of left angle of mandible. Above right: Anteroposterior view of mandible. Irregular osteolytic lesion of mandible with erosion of cortex and soft tissue mass. Below left: Lateral view of mandible. Note osteolytic lesion with erosion of cortex at angle. Below right: Aspiration biopsy specimen of left angle of mandible. Note similarity of adenocarcinoma to liver biopsy specimen in Figure 1, right

Roentgen therapy is the preferred treatment.

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†Intern, Misericordia Hospital.
‡Assistant radiologist, Misericordia Hospital.

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Diagnosis of sialolithiasis: *report of case*

■ *Alfred E. Viener, D.D.S., Coral Gables, Fla.*

Salivary stones may be located in the ducts of salivary glands or in the glands themselves. A single stone or multiple stones may be present. The etiology of these stones is unknown; however, it is postulated that desquamated epithelial cells or bacteria may form a nidus around which the stones form.[1]

Several diagnostic aids are available to facilitate the detection of sialoliths. The clinical findings and history will enable the examiner to make a preliminary diagnosis of either stenosis of the duct or obstruction by one or more stones. The principal symptoms may include any combination of the following: (1) pain and swelling over the gland involved which is increased on eating or at the sight of certain foods; (2) an inflammatory reaction in the mucosa around the orifice when a stone is present near the orifice of the involved duct, and (3) repeated acute exacerbations of secondary or primary infections in the gland which may involve not only the gland but also the surrounding soft tissues and result in a diffuse cellulitis.

In instances of partial obstruction, the pain and swellings may disappear gradually after the gland empties, or compression of the gland may cause immediate emptying and relief. Frequently pus can be expressed from the duct because of infection by the chronic irritation of a jagged stone. Back pressure of saliva caused by an obstruction, or constant irritation by a stone, predisposes the gland to infection.

In a great percentage of patients with a nonspecific inflammation of the salivary glands, calculi will be found if the parotid gland is involved.

Complete extraoral roentgenographic examination should include a lateral view of the mandible in an open bite position, a posteroanterior view of the mandible, and a view of the zygomatic arch. Iodized oil such as Lipiodol also can be used to make a sialographic study. In the experience of the author, however, intraoral roentgenograms are the most reliable for the detection of stones.

A dental film placed against the mucosa of the cheek, with the center of its anterior border over the orifice of Stensen's duct and the rays directed at right angles to the film, will produce an excellent view of any stones lying in the anterior part of the duct. By directing the rays more anteriorly with the film in approximately the same position, or more posteriorly, a survey of a more posterior section of the duct can be made.

If stones are suspected in the sublingual or submaxillary gland or ducts, a large occlusal film, placed between the upper and lower teeth with the cone directed just posterior to the mentum and at right angles to the film, will give an excellent view of any calculi in the tissues of the floor of the mouth.

Removal of calculi from the duct of a salivary gland can be accomplished in different ways, depending on several factors, among which are: (1) size and shape of the stone; (2) location of the stone in the duct; (3) the length of time in which the stone has been present in the duct; (4) the condition of the patient (for example, it would be difficult during an acute exacerbation), and (5) the duct in which the stone is located (Stensen's, Wharton's, or sublingual).

If the stone is small enough, frequently it can be milked out of the duct. This usually can be accomplished only in those instances in which the stone is located in the anterior portion of the duct. The duct is dilated with suitable probes, then the stone is expressed by manual manipulation along the duct. Care must be taken to prevent forcing the stone farther back into the duct with the probe or during manual manipulation. This procedure is successful more often in removing stones from Wharton's duct than from Stensen's duct, the course of the former being straight in comparison to the latter. Stones in Stensen's duct often are located posterior to the almost right-angle curve of the duct as it passes around the anterior border of the masseter muscle, thus making removal by manual manipulation difficult. Stones located in the salivary ducts in the floor of the mouth are easily removed surgically. Those located in Stensen's duct, however, are much more difficult when it occurs in that portion of the duct that lies lateral to the masseter muscle. The increased difficulty is due to poor accessibility.

Occasionally a patient will have the classic symptoms of an occluded duct, but no stone can be found. In these instances, before Lipiodol studies or duct dilation is done, simple milking of the gland may produce a mucous plug which was the etiological factor. When a stricture is found on a sialogram, the examiner should not give up his search for a stone until all the previously mentioned diagnostic aids are exhausted, as a stricture is sometimes found concomitant with a stone. When no stone is present, the injection of an iodized oil for diagnostic purposes is of therapeutic value for its antiseptic properties as well as its function as a lavage. I have seen cases which were apparently cured after a sialogram and which on a two year follow-up had no recurrence of the symptoms.

The following case report illustrates a technic for surgical removal of a stone located in Stensen's duct:

REPORT OF CASE—On July 13, 1959 a white man, age 30, presented himself in the clinic with considerable swelling in the preauricular region on the left side; the cellulitis extended into the neck and lower eyelid.

HISTORY—The patient was a sergeant in the U. S. Air Force previously stationed at another base. The following is a summary of the pertinent information extracted from his medical record.

On April 19, 1955 he had complained of pain at the angle of the right side of his jaw on eating. No swelling of the parotid gland or its duct was seen. Two weeks later, parotid swelling occurred, and he complained of increased pain after eating. On May 5 a sialogram had been taken, and the results were negative. The patient did not return until October 15, 1957, with recurrence of pain and swellings. He was asked to eat a lemon. Eating the lemon caused increased swelling and pain. Swelling was decreased with pressure. At this time a diagnosis of chronic obstruction of one of the accessory ducts, cause unknown, was made. Another sialogram was made and was negative. Suggested treatment was periodic dilation of Stensen's duct. When he returned on October 29, he felt better and treatment was deferred.

On July 6, 1959 he returned with a history of many recurrences and remissions during the previous two years. This time the symptoms had been present for six days. He had marked swelling and induration in the parotid gland region. On the basis of previous negative results of roentgenographic studies, no roentgenograms were made. He was put on chloramphenicol, 250 mg., four times daily. The treatment plan at this time was to clear up the acute exacerbation and then use radiation in an attempt to cause atrophy of the gland. After four days, there was no response to treatment, and the patient was referred to the dental clinic for evaluation.

EXAMINATION—Examination at the dental clinic revealed an indurated swelling in the parotid gland region with cellulitis extending into the neck and lower eyelid (Fig. 1). The patient's temperature was 100°F. On compression of the cheek, a purulent exudate exuded from the orifice of Stensen's duct. No inflammatory reaction of the mucosa around the

Fig. 1—Indurated swelling of parotid gland on right side with cellulitis extending into cervical region below

orifice was noted. Two intraoral roentgenograms were taken in the manner previously described. A stone could be seen clearly on the film (Fig. 2). It was also noted that the stone was a considerable distance from the anterior margin of the film, which had been placed in the mouth on a level even with the orifice. Because of this, and the absence of inflammatory reaction around the orifice, it was believed that the stone was distal to the right-angle turn of the duct as it passes around the anterior border of the masseter muscle. Swelling and induration were so excessive that palpation of the stone was not possible.

TREATMENT—The patient was placed on Terramycin 250 mg., four times daily, and hot compresses were applied continuously to the left side of his face. Within 48 hours the cellulitis involving the lower eyelid and neck had subsided. The indurated swelling in the parotid gland region persisted. It was believed that the acute stage had subsided and removal of the stone was now indicated although the stone was not palpable.

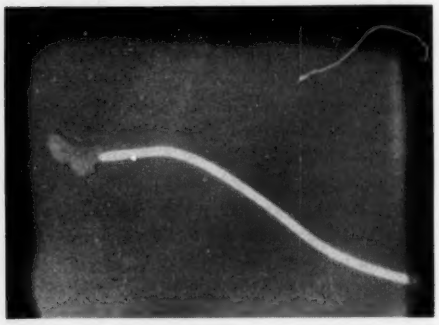

Fig. 2—Intraoral view showing stone located in Stensen's duct

In the mucobuccal fold opposite the orifice of Stensen's duct, 1.8 cc. of lidocaine hydrochloride 2 per cent with 1:100,000 epinephrine was infiltrated. One cubic centimeter additional anesthetic solution was administered for a long buccal block. A vertical incision was made about 3 cm. long bisecting the orifice. A probe was placed into the orifice until it reached the right-angle turn in the duct. A second incision was made, horizontal in direction, beginning at the orifice and extending posteriorly (Fig. 3). By placing the thumb outside the cheek over the anterior border of the masseter muscle, and the index and second fingers in the mouth, tension was exerted on the duct, thereby tending to straighten it. The two flaps inscribed by the previous incisions were reflected, and by blunt and sharp dissection, the duct was exposed and split to the anterior border and outer surface of the masseter muscle.

Exposure of the duct to this point was not difficult because the probe previously inserted provided a guide to its whereabouts. It was believed that the insertion of the probe past the angle might displace the stone posteriorly.

Therefore, dissection from here on was done carefully and without the aid of the probe. It was necessary to make an incision in the anterior border of the masseter muscle in order to expose that portion of the duct lateral to the muscle. The stone was found about 1 cm. posterior to the anterior border of the muscle and was removed.

Immediately on removal of the stone, about 10 cc. of a thick mucopurulent exudate flowed from the duct. A small polyethylene tube was inserted in the duct, and the deep tissues were closed with no. 0000 gut sutures. The mucosa around the tube was closed with no. 0000 silk.

On the following day, the patient noted a great reduction in pain, and swelling was somewhat reduced. Terramycin was continued, as were hot packs and hot saline rinses.

One week after surgery, the polyethylene tube and mucosal sutures were removed. Swelling had completely subsided at this time. However, no saliva could be expressed from the gland. Antibiotic therapy was stopped. The patient was seen one week later and initial dilation of the duct was begun. Starting with a no. 1 probe and progressing up to a no. 12 probe, the duct was dilated, and each progressive size probe was allowed to remain in the duct for a period of five to ten minutes. This treatment was repeated every other day for three days.[2]

The patient returned in one month, at which time a small amount of saliva was expressed from the duct. The patient was advised to return in six months for observation. At this subsequent visit the gland was functioning normally.

COMMENT—In chronic, recurrent parotitis, even though previous roentgen-ray studies are negative, a stone must be suspected as a likely etiological factor. Intraoral roentgenograms will more often reveal the presence of a stone than any other type. If no stone can be found, then an organic plug or a stricture of the duct must be suspected. Differentiation between these two possibilities usually can be made with a sialogram.

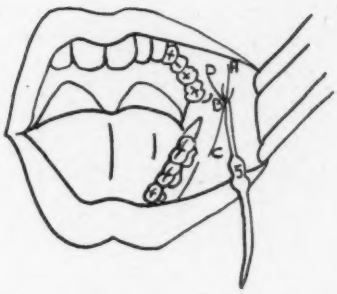

Fig. 3—Diagram illustrates flaps made to gain access to stone lying lateral to masseter muscle. Incision AC and DB describe flaps ABD and CBD

Postoperative treatment after surgical removal of a stone should include dilation of the duct to prevent stricture. The duct was dilated in this case using successively larger flexible probes.

Chronic recurrent infections, with or without acute exacerbations, are indicative of obstruction either by stones, organic material or debris, or strictures. Special diagnostic tests are used to diagnose specific infections such as tuberculosis and syphilis.

In the case reported here, the polyethylene tube used as a drain was not believed to be adequate, as blockage of the small orifice occurred, requiring frequent irrigation to unstop the tube. A long, thin rubber dam drain would probably serve the purpose more satisfactorily.—*1550 South Dixie Highway.*

1. Archer, W. H. Manual of oral surgery. Philadelphia, W. B. Saunders Co., 1952, p. 274.

2. Thoma, K. H. Oral surgery, vol. 2, ed. 2. St. Louis, C. V. Mosby Co., p. 1028.

Bilateral condylar neck bisection for long-standing dislocation of the mandible: *report of case*

■ *John G. Whinery, D.D.S., Amarillo, Texas*

This case is reported for three reasons: (1) it demonstrates one previously unpublished way of handling a long-standing dislocation of the mandible; (2) it demonstrates unimpaired mandibular movement and occlusion after bilateral mandibular "condylectomy" (this case has been observed for four and a half years after surgery), and (3) it presents interesting evidence (one case) of the relative unimportance of the bony joints in the function of the jaw. Whether or not the bony joint is essential to normal mandibular function is a question of prime clinical import. Two controversial operations are based on the importance (or unimportance) of this bony joint. They are: (1) the reduction of fracture-dislocated condylar heads, and (2) the condylectomy for temporomandibular joint dysarthroses (high or low section).

Dislocations of the mandible are usually distressing to the patient, and treatment is sought immediately. The diagnosis is obvious, and treatment has remained essentially the same for 50 centuries.[1] Thus nearly all dislocated mandibles are reduced promptly. In this case, however, the dislocation existed for an estimated two and a half months. The reasons for this are that the patient was first unconscious, then semiconscious—flaccid, limp and uncomplaining. The deformity was not noticed by attending personnel or family for at least two months. This unusual case thus presented a unique surgical problem and opportunity for study.

REPORT OF CASE—The patient, a 20 year old white woman, was first examined by the author July 26, 1956, on referral by the neurosurgeon in attendance. The patient was unable to close her mouth. She presented the usual picture of a bilaterally dislocated mandible—wide open bite, occluding only in the second molar region. The patient, who was very thin, walked only with help. She spoke only when spoken to, and her speech was halting and not easily understood.

HISTORY—On March 11, 1956, the patient had sustained severe cerebral contusions and facial lacerations in an automobile accident. She was comatose. Emergency procedure consisted of suture of lacerations. On March 14 the sclera of the right eye was debrided and sutured while she was under endotracheal anesthesia. On March 23, again with the patient under endotracheal anesthesia, chronic subdural hematomas were drained via bilateral trephines in the temporal and frontal regions and in the left posterior parietal region. On March 30 a small recurrent hematoma was drained, and an extensive craniectomy and wide subdural decompression were carried out with the patient under endotracheal anesthesia. Severe edema with brain herniation was noted.

On April 12 the right eye was enucleated for endophthalmitis, under general endotracheal anesthesia.

The patient's postoperative course after the second neurosurgical procedure was extremely stormy. She remained semiconscious several weeks, responding only to noxious stimuli. Improvement progressed during the final two weeks of hospitalization with movement of all her extremities at the time of discharge from the hospital May 16.

The patient was fed and cared for at home, being seen occasionally by the family physician. On re-examination by the neurosurgeon July 25, the jaw was observed to be dislocated bilaterally. Attempts to reduce it manually were not successful. The family did not know the duration of the dislocation but thought the "mouth had been hanging open ever since she was in the hospital." The duration of dislocation was thought to be at least two months and perhaps four months.

TREATMENT—The patient was hospitalized and on August 3 she was anesthetized for the fifth time via a naso-endotracheal tube. The jaw could be moved; it would open and close, and some lateral movement was possible. However, the foreward condylar dislocation could not be reduced on either the right or left side. It was decided to bisect the condylar processes. In anticipation of this, Ivy loops of .020 stainless steel wire had been placed on all posterior and cuspid teeth.

The preauricular skin was cleansed. An incision about 2 cm. in length was made through the skin overlying the necks of the condyloid processes, which could be palpated easily. The incision was at right angles to the condyloid process. With further careful dissection, branches of the facial nerve were visualized and retracted. The bone was exposed and cut nearly through with a no. 703 cs bur under irrigation. A child size nasal speculum proved to be an excellent soft tissue retractor for this procedure. The bisection then was completed by twisting a flat instrument in the cut to fracture the bone. The bone was sectioned about 1 cm. below the head of the condyloid process. The wound was closed with subcuticular gut and interrupted no. 0000 silk skin sutures. The same procedure was accomplished on the opposite side.

Attempts to bring the teeth into centric occlusion were nearly successful. The 2 to 3 mm. open bite was reduced within a half hour by only slight traction with intermaxillary elastics. The postoperative course was uneventful, and the patient was discharged on the second postoperative day.

Constant intermaxillary traction was maintained for 26 days; however, the jaw could be opened slightly with effort. The elastics were removed on August 29 (the twenty-sixth postoperative day) and replaced on August 31 because of an open bite that was developing. On September 14 good lateral excursion movements were obtained. Opening was about half normal, and the teeth closed in centric occlusion. "Loose" elastic intermaxillary traction that permitted jaw movement was continued until October 22. One week later the occlusion remained excellent, and all movements were good. The arch bars were removed.

RESULTS—The patient was observed in January and June of 1957 and 1958, and in November of 1959 and 1960. The occlusion was exactly that occlusion which existed prior to the accident and dislocation. The same facets of occlusal wear were present in contact and function in the centric, lateral and incisive positions. Nearly normal opening and lateral jaw movements were possible.

The results of surgery and healing of the mandible are shown in the accompanying illustrations (Fig. 1-3).

The patient has improved substantially and is now able to speak clearly and walk without help.

DISCUSSION—The patient possessed a complete dentition in which no apparent tooth movement occurred during the period of dislocation or treatment. This stable, intact dentition also facilitated the accurate observation of occlusion.

The strength of her musculature in general was greatly diminished. Whether this existed in her muscles of mastication was not

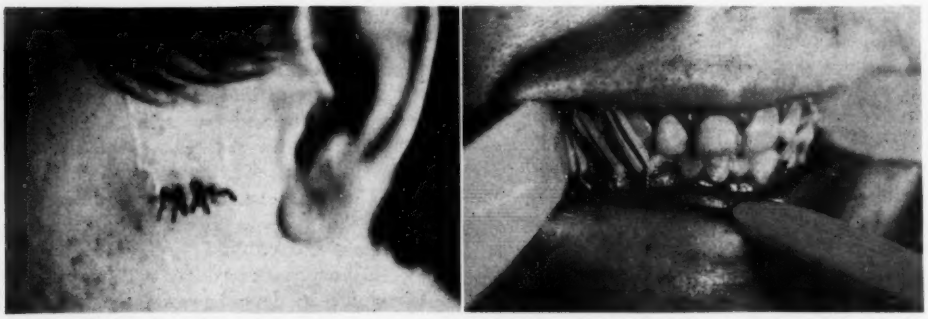

Fig. 1—Left: Left operative site on third postoperative day. Right: Ivy loops and intermaxillary elastics

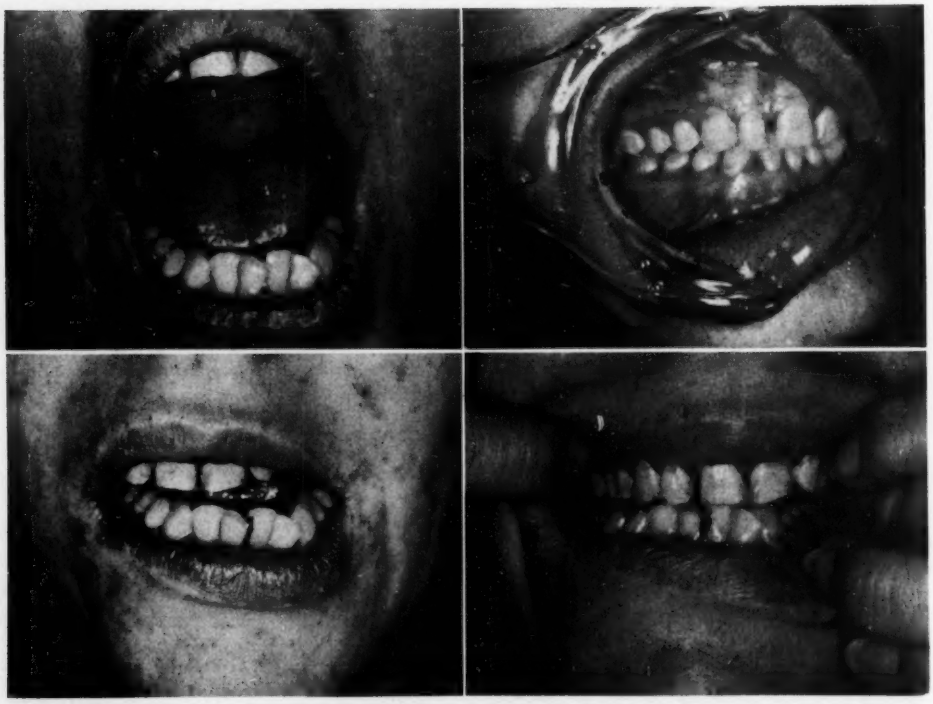

Fig. 2—Above left: Jaw opening, fourth postoperative month. Above right: Centric occlusion November 1959. Below left: Left lateral excursion. Note suture tied between lower central incisors to indicate midline. Below right: Right lateral excursion. Note suture tied between lower central incisors

observed, but it is assumed that it did. It is not known whether this factor related to the postoperative "stability" of the intermaxillary relation. At last observation she could crush an applicator stick between any of her posterior teeth.

Although this case is unique in that the dislocation existed two to four months, it is much like the fairly common cases of bilateral condylar fracture dislocation. If fracture dislocations of condylar heads are not reduced, the clinical situation duplicates the case here reported. Duplicate results can be expected by treating in a similar manner. Exception to this statement may be made for certain instances in which condylar growth is still in process. This is a moot point.

Occasionally a case of intractable pain from a temporomandibular joint dysarthralgia will require condylar resection. The possibility of decreased function after condylar resection is considered a deterrent to this surgery. The case here reported is one evidence that jaw function need not be jeopardized and need not be considered a deterrent to condylar resection (either high or low level). The more conservative though difficult operation of meniscectomy cannot be justified by any thought of preservation of function.

The operation here described for long-standing mandibular dislocation is a simple and quick one. It is much less traumatic and less difficult than recreating the joint by excising the tissue from the glenoid fossae. Results of this case (as well as bilateral fracture dislocation cases) would indicate that condylar neck bisection is the operation of choice for unreducible mandibular dislocations of long standing.—*2412 Line Avenue.*

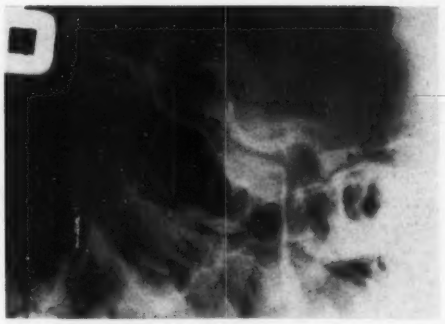

Fig. 3—Temporomandibular articulation right side November 1959. Left side was not well visualized. Note reversed convexity-concavity as condyle "articulates" against articular tubercle

1. Prinz, Hermann. Dental chronology. Philadelphia, Lea & Febiger, 1945, p. 17.

■ Scientific Attitude

The trouble with the world today, most scientists believe, is not that there is too much science but rather that the scientific attitude—the essence of science—is far too little understood and too inadequately applied to human problems. Even among scientists themselves, outside their own specialties, the scientific attitude is far too rare and is never fully developed.—*Robert S. Mulliken. On the Art of Being a Scientist. I. How a Scientist Thinks. Context 1:12 Spring 1961.*

Embryonal rhabdomyosarcoma, botryoid type, in an adult: *report of case*

■ *Gerald H. Bonnette,* D.D.S.; Harry J. Dennis, D.D.S.,† and Charles S. Scruggs,† D.D.S., Portsmouth, Va.*

Embryonal rhabdomyosarcoma, botryoid type, is an extremely rare tumor in the oral region of adults. It is a combination of two morphological variants of rhabdomyosarcomas, both of which occur almost always during infancy or early childhood. It represents a malignant form of rhabdomyoma[1] and metastasizes by either blood or lymph routes.

Horn and Enterline[2] reported a study of 39 cases collected from a number of sources and suggested the possibility of more frequent occurrence of the tumor than was originally thought; however, only three of the total number reported involved the oral cavity. One, a pleomorphic type, was stated to be within the bone of the mandible whereas another, a botryoid type, was in the maxillary antrum. The former instance occurred in a 9 month old and the latter in a 10 month old infant. The third case reported was an embryonal type in the parotid area of a 10 year old child. No case of the fourth type (alveolar) occurred in the oral cavity. All of the botryoid and all but one of the embryonal rhabdomyosarcomas were in infants or children, and are said to be closely related, differing principally in form and location.

Over a 17½ year period, reports on 15 cases of embryonal rhabdomyosarcoma were entered in the files of Memorial Hospital in New York and were presented by Stobbe and Dargeon in 1950.[3] The average patient age was 6.1 years; the youngest 22 months, and the oldest 16 years in this study. Those related to the oral structures included one in the parotid region, three in the palate, and one at the angle of the mandible. Of these five patients, two were infants and three were young children of five, eight and nine years of age.

Only one case other than the one being reported has been recorded at this hospital in the past five years. That one was a rhabdomyosarcoma of the bladder in a six year old child admitted for treatment in June 1958.

COMPLAINT AND HISTORY OF PRESENT ILLNESS—A 24 year old white aviation machinist in the United States Navy was admitted on December 2, 1959 as a referral patient to this hospital for observation and treatment of a recurring tumor mass in the left cheek and neck. He had previously been admitted to another hospital (September 11, 1959) with the chief complaint of a swelling in the buccal mucosa of the left cheek. The patient was asymptomatic except for this swelling which was painless and growing slowly. It had been noticed first three months previously. It was further reported that the physical examination revealed several small masses posterior to the orifice of Stensen's duct. These were surgically excised, submitted for pathological diagnosis, and subsequently reported as mixed tumor of the salivary gland (Fig. 1). Recovery was reported as uneventful and the patient was instructed to report for follow-up observation at three month

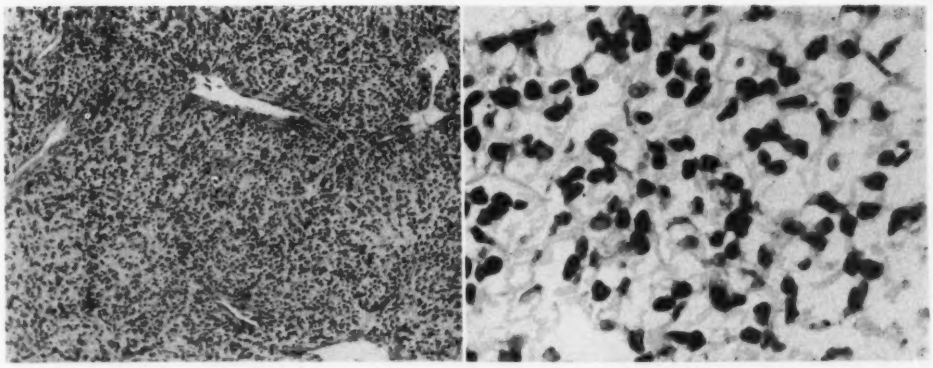

Fig. 1—Sections of original specimens, mixed salivary gland tumor. Armed Forces Institute of Pathology photomicrographs

intervals after his discharge to duty from the hospital. Two months later the patient was readmitted to the hospital because of a recurrence in the same region. Examination revealed an extension to the submaxillary area and arrangements were made for transfer of the patient to this hospital for treatment.

EXAMINATION—The clinical examination revealed a well developed, well nourished white man in no apparent distress. He was cooperative and friendly and his general appearance was excellent except for the noticeable tumor mass in the left cheek (Fig. 2, left). This was nonfixed, hard, nodular, and nontender. It measured 4 by 5 cm. and was equally visible intraorally (Fig. 2, right) where it appeared to extend into the pharynx. There was considerable involvement of the submaxillary

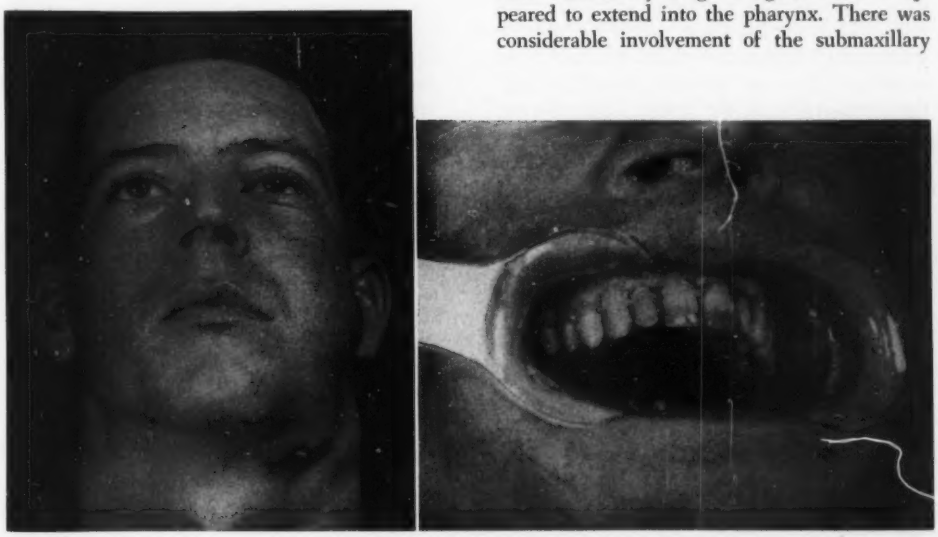

Fig. 2—Left: Clinical appearance of recurring mass two months after original excision. Right: Intraoral involvement of buccal and pharyngeal regions

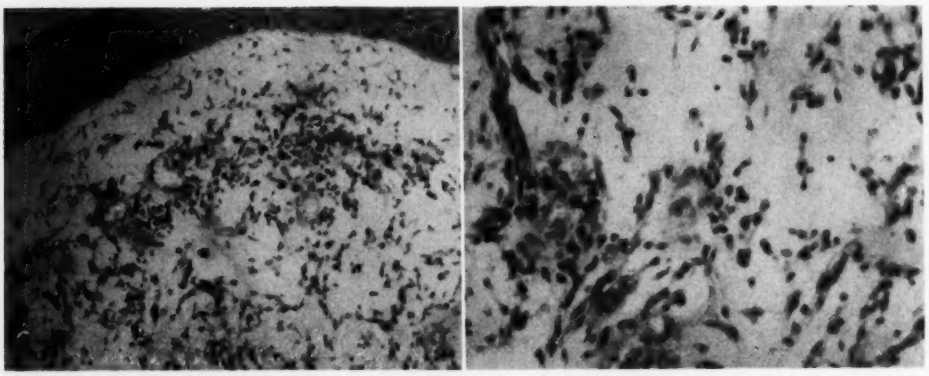

Fig. 3—Photomicrographs of biopsy of recurring lesion. Histological picture shows certain degree of cellular pleomorphism which is evidenced by the number of small, irregular, spindle cells with some hyperchromatic giant cells as shown in the center of enlarged field in the picture at the right. Nuclei of small spindle cells are ovoid and vesicular, usually exhibiting more mitosis than seen in this particular section. It is characteristic of rhabdomyosarcoma to have its cellular elements arranged in a haphazard manner as seen in this section of the tumor. There also is tissue in the section which resembles embryonic mesenchyme

gland as well as the anterior cervical lymph nodes.

Physical examination was essentially negative and noncontributory.

Laboratory studies, including roentgenologic, hematologic, serologic and urinalysis, were within normal limits except for a roentgenographic examination of the left side of the mandible which was reported to show a slight demineralization at the angle. This was not considered by the roentgenologist as evidence of invasion of the mandible.

TREATMENT AND COURSE—The tumor mass was biopsied intraorally and the pathological diagnosis of embryonal rhabdomyosarcoma, botryoid type, was established (Fig. 3) with verification by the Armed Forces Institute of Pathology.

The patient was presented to the Hospital Tumor Board for evaluation and recommendation. In view of the extent, rapid growth, poor prognosis, and region involved, palliative radiation therapy was recommended. This was completed in 32 days. It consisted of 23 treatments to a 15 by 20 cm. field on the left side of the face to a depth of 2 cm. for a total tumor dose of 4600 r. The response to this therapy was excellent. The tumor mass "melted away" until it was impossible to demonstrate the lesion clinically (Fig. 4). The patient was given 21 days sick leave after the foregoing treatment. He returned from leave completely asymptomatic and expressed a desire to return to active duty.

He was again presented to the Tumor Board on February 26, 1960 with the recommendation that he be discharged from the hospital pending review of his case by the physical evaluation board. This was done on March 3, 1960.

On May 19 he was retired to his home where he gradually became less and less active because of decreased physical stamina; by May 25, 1960 he was bedfast. Two days later he had an episode of epistaxis which could not be controlled and he was admitted to a local military hospital for treatment. He was given whole blood and the epistaxis was controlled except for chronic oozing.

Examination reports at this admission revealed a thickening in the region of the left buccal mucosa. The liver was palpable approximately two finger breadths below the right costal margin and four finger breadths below the xiphoid process. There were large, nontender, lymph nodes in the cervical chain bi-

laterally, in both axillary regions, and in the inguinal regions. Some nodes were discrete whereas others were matted. Examination of the skin revealed many nontender cutaneous nodules of the scalp, neck and trunk, ranging from 0.2 cm. to 1 cm. in diameter. There were numerous small petechiae over the neck, trunk and extremities.

Roentgenographic examination revealed a multilobular mass in the right midlung field measuring approximately 3.5 cm. by 3 cm. Serial laboratory studies made over several days revealed a drop in hemoglobin from 10.3 Gm. to 6.4 Gm. and a drop in hematocrit from 33 per cent to 22 per cent. The mild leukocytosis decreased from 16,500 to 10,900 in three days with a decrease in neutrophils and an increase in lymphocyte proportion.

It was agreed, after examination and consultation at that hospital, that this was a malignant growth with widespread metastases, with the probable approach of the terminal event. On June 1, 1960 the patient lapsed into unconsciousness, began Cheyne-Stokes respirations and died.

DISCUSSION—The diagnosis of rhabdomyosarcoma may be extremely difficult to make, particularly in the early stages, as clinical recognition is rare and pathological diagnosis is also often missed. It may be confused easily with neuroblastoma and even with lymphosarcoma. The cross striations seen in the more mature forms are difficult to demonstrate in the embryonal types and may be completely absent, whereas anaplastic spindle cells and round cells are more abundant in the latter.

Review of both specimens revealed characteristics of the respective diagnoses. There were definite features of mixed tumor in the original specimen whereas all consultants agreed with the final diagnosis of embryonal rhabdomyosarcoma when they reviewed the second specimen.[4]

All authors agree that this tumor has a great tendency to recur locally and that the only hope for a cure is an early diagnosis with extensive excision[5], perhaps followed by roentgen-ray therapy. Although these tumors are not considered radiosensitive, the rapid response to radiotherapy and the regression of the lesion in this instance, therefore, was somewhat unusual. Ulin,[6] however, supports the theory of rapid response of these tumors and states that although the first impression may be gratifying,

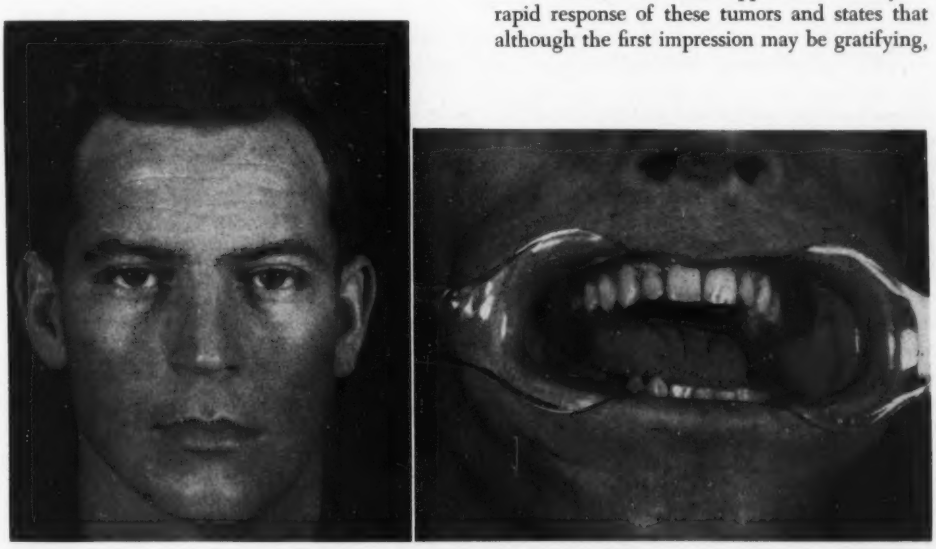

Fig. 4—Postradiation views taken at time of discharge from the hospital, showing the apparently complete resolution of tumor

the tumor will recur and no prolonged cures by this therapy have been reported.

The extensive and rapid recurrence of the tumor described here favored the choice of radiotherapy. Radical surgery, the preferred approach, was ruled out on the basis of the extensive, widespread and infiltrating growth.

SUMMARY—A 24 year old man with embryonal rhabdomyosarcoma of the botryoid variety was referred for observation and treatment. The unusual location of the tumor, the rapid growth, the importance of early recognition, and the treatment have been reviewed.

The opinions or assertions contained in this article are the private ones of the writers and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

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†Lieutenant Commanders, Dental Corps, U.S. Navy.

1. Thoma, K. H. Oral pathology, ed. 3. St. Louis, C. V. Mosby Co., 1950, p. 1473.

2. Horn, R. C., Jr., and Enterline, H. T. Rhabdomyosarcoma: a clinicopathological study and classification of 39 cases. Cancer 11:181 Jan.-Feb. 1958.

3. Stobbe, G. D., and Dargeon, H. W. Embryonal rhabdomyosarcoma of the head and neck in children and adolescents. Cancer 3:826 Sept. 1950.

4. Hansen, L. S. Personal communication.

5. Stout, A. P. Rhabdomyosarcoma of skeletal muscles. Ann. Surg. 123:447 March 1946.

6. Ulin, A. W.; Shoemaker, W. C., and Froio, G. F. Rhabdomyosarcoma of tongue. New England J. Med. 250:98 Jan. 21, 1954.

■ No Plateau in Research

Research in the medical and biological area needs to be increased with greater usage of the physical, chemical and mathematical tools. Lest we become too much satisfied with our recent accomplishments and think no more money is necessary, let us take a look at our deficit. In the field of these organic afflictions of the brain and nervous system, we are barely beyond the point of naming them accurately, and, unless they are caused by injury, infectious agent, or a cancer, we know nothing really about their origin. The whole array of mental disorders will probably some day yield to a biochemical-biophysical explanation, but as yet our book of knowledge about this, the most prevalent of disorders, is still in the preface stage. In the field of infections we have made the most notable strides, but here again the infectious agents, like all living things, eventually learn to fight back, and more and more pathogenic strains are gradually exerting a greater stubbornness about yielding to medication. An antibiotic has not been found for a virus infection, we have not succeeded in forcing the common cold to yield, and there are probably literally dozens of yet-undiscovered new strains of virus pathogens.

Lest you think I am deprecating or minimizing our forward march in medical research, let me assure you the opposite is true. The point I wish to make is—this is no time to plateau our research program. In view of the government's interest in medical research, many have asked, can industry afford to maintain or enhance its research program? To me these words are in inappropriate order. The real question is, can industry afford not to?—*Lowell T. Coggeshall. Context 1:7 Spring 1961.*

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The significance of the International Conference on Oral Surgery

By this time most oral surgeons are aware of the fact that an International Conference on Oral Surgery will take place in London, England, next summer. Aside from its scientific and professional implications, what is the significance of this conference?

Movements are afoot in all areas of American life to coordinate our ideas with the thinking of people in other nations. This is true in economics, in politics, in medicine, and in dentistry. The basic significance of a meeting of minds of people from our country and abroad supersedes the original purpose of the conference. Why did the American Society of Oral Surgeons not think of holding such a conference 20 years ago? It is not enough to say that national consolidation was necessary before international activity could be established. The International Conference on Oral Surgery is a sign of the times. How many American oral surgeons would have been interested in the opinions of European and Asian oral surgeons a decade ago—interested enough to travel three or more thousand miles to hear them? Few to be sure, because those were the early days of America's emergence from relative intellectual isolation. As a matter of fact, it is only in the last few years that in many segments of American society an urgent race has begun to catch up with lost time. Oral surgery is one field among many in which that is necessary.

Every American oral surgeon who goes to London is an American first, a dentist second, and an oral surgeon third. He will represent his country before his profession and his profession before his specialty. By next summer, his burden of responsibility as an American is likely to be even greater than it is today.

It is for these reasons, even above scientific and professional ones, that gatherings of the Fédération Dentaire Internationale, the International Association for Dental Research, and conferences of special groups within our profession take on great significance in these turbulent times; and when American dentists attend such meetings, they become part of American foreign policy whether they are aware of it or not.

Let those who plan to go to London remember these responsibilities, and, aside from preparing for the specific objectives of the conference, let them remember also that being well-informed and accepting graciously the role of unofficial ambassador of good will are an important part of their responsibilities in mixing with professional men of other nations.—*Bruce L. Douglas.*

The first International Conference on Oral Surgery

THE FIRST INTERNATIONAL CONFERENCE ON ORAL SURGERY will provide an outstanding opportunity for all oral surgeons and other dentists interested in oral surgery to exchange ideas and establish acquaintances and lasting friendships with their colleagues the world over. Excellent scientific, social and sight-seeing programs have been developed. Since this meeting is international in nature, it will not be limited to members of the American Society of Oral Surgeons and their guests. Instead it is hoped that everyone interested in oral surgery will attend.

Oral surgeons the world over have never had a proper opportunity to gather together, explore each other's ideas and methods or to become personal friends. From these standpoints, the first International Conference provides an exceptional and exciting opportunity. American oral surgeons will find to their delight that their professional colleagues from other lands not only have much to offer in the diagnosis and treatment of patients, but in addition are a delightful group of people with whom it will be a real privilege to associate. Every oral surgeon who can possibly consider attending should do so. He will return to the United States a better citizen of our country, a better oral surgeon and with a fresh enthusiastic respect for our confreres abroad. Above all he will have a new and stimulating appreciation of the value of international relations. It is indeed a rare opportunity and one that none of us can afford to miss.—*Fred A. Henny.*

ENCYCLOPEDIA OF MEDICAL SYNDROMES. By Robert H. Durham. 628 pages. Index. $13.50. New York, Paul B. Hoeber, Inc., Medical Division of Harper & Brothers, 1960.

The usefulness of this extensive, cross-indexed encyclopedic text of eponymic and descriptive syndromes is readily obvious since information has been brought together for easy reference which is nowhere else so readily available. The encyclopedia should, indeed, be of interest to both the casual reader and the medical specialist in innumerable fields.

To appreciate this reference text, the terms "syndrome" and "disease," which the author notes are often unwittingly used interchangeably even though they are not synonymous, must be appreciated. "Typical syndromes are usually either congenital, familial, or hereditary and are the result of genetic abnormality. These variations depend upon the presence of a single pleiotrophic gene or of two or three linked genes. Not infrequently such inherited abnormalities include an inexplicable combination of two, three, or even four seemingly unrelated conditions."

The author has handled his subject matter adequately for the space at his disposition. The material is briefly presented and easily read. It has not been organized as to subject matter, a seemingly important but perhaps impossible task, inasmuch as the components of the syndromes vary fantastically amongst themselves. Type size and style are readable. Quality of paper and binding is acceptable.

There will be many who feel that the thumbnail description of these innumerable syndromes is too sketchy and unsatisfying to the reader even though one or more suitable references are presented for each syndrome which the eager investigator, student, or reader may consult for further details. One would hesitate to make important medical decisions based on the knowledge presented on any given syndrome in this volume.

One might also question whether the list of synonyms, one of the most important aspects of this book, is entirely complete.

Nevertheless, this reference text will be valued—especially by those who feel that the ability to know where to find out about a disease is second only to knowing about the disease itself.—*Austin H. Kutscher.*

■ NUTRITION IN CLINICAL DENTISTRY. By Abraham Nizel. 467 pages with appendixes. $10. Philadelphia, W. B. Saunders Co., 1960.

This book is far more comprehensive in its coverage than the title implies. The greater share of the content is a discussion of basic concepts of physiology, physiologic chemistry and chemistry as they relate to the oral tissues and to nutrients, as well as a considerable compilation and review of pertinent research regarding their interrelationships. Specific outlines of advice for patients of differing dental conditions are given in Section 2. The author is to be commended for his consistent emphasis that diet suggestions and guides including lists of foods and beverages should be given in specific and not general terms.

The use of many subheadings in black type delineates the subject matter and serves to guide the reader to the phases he wants to explore. Because this comprehensive text and source book presumes a background in chemistry and physiology, it is well suited to the dental student and for the practicing dentist who wishes refresher and current material, but it probably is too technical for the dental hygienist.

For Section 1, "Basic Nutrition," Dr. San-

ford Miller has supplied two chapters. For Section 2, "Applied Nutrition," Miss Isabel Patterson prepared two chapters on interpreting and applying nutrition knowledge. These latter chapters are excellent, particularly for any health worker whose nutrition background might be sketchy.

Most of the statements in the text are well within accepted knowledge, but occasionally some are presented with implications which may be questioned. For example, the reviewer is not aware that the beneficial effectiveness of foods as vehicles for fluoridation has been tested with regard to caries reduction in man. Nonetheless, the dentist who wishes to give his patients a total dental health service rather than one limited to local mechanical technics will find this book an effective guide to the roles of diet and nutrition.—*Dorothea F. Radusch.*

■ DENTAL CLINICS OF NORTH AMERICA, SYMPOSIUM ON OFFICE ORAL SURGERY. By Edward C. Hinds, consulting editor. 826 pages. Philadelphia, W. B. Saunders Co., Nov. 1959.

This issue of the *Dental Clinics of North America* is devoted to the specialty of oral surgery, and pertains especially to the treatment of outpatients. Although more and more oral surgical procedures are being performed in a hospital atmosphere because of present day training and the emergence of more health insurance programs, the majority of work is handled in the office. This volume is intended not only for the specialist but for the dentist in general practice as well.

The contributors to this issue are many, and are distinguished both by formal education and clinical experience. They present many of the problems which are encountered in office practice and methods of solving these problems.

Among the subjects which have been included are preoperative evaluation, problems in sterilization, the use of antibiotics, complications associated with oral surgery, postoperative care, management of impactions and cysts, and surgery to prepare the mouth for prosthetic appliances.

Each chapter gives an insight into the way the individual practitioner conducts his practice and much can be learned from each author. The reader is encouraged to adapt their technics to his individual circumstances.

This is not intended as a formal textbook and therefore some redundancy exists in the various chapters. This disadvantage, however, does little to detract from the usefulness of the book.

The issue is highly recommended to both the oral surgeon and general practitioner as a practical and up-to-date review of the management of everyday problems. Reading it is a worthwhile and stimulating experience.—*David L. Ford.*

■ REVIEW OF DENTISTRY—QUESTIONS AND ANSWERS. By M. K. Hine, editor. Third edition. 567 pages. $9. St. Louis, C. V. Mosby Co., 1961.

This is the third edition of *Review of Dentistry*. The second edition, edited by James T. Ginn, was published in June 1956.

The book has been extensively revised and brought up to date; however, the format of the book remains essentially the same. The bulk of the material is presented in the essay type of question. At the end of each section is a group of sample true-false, completion and multiple choice questions.

Review of Dentistry will continue to serve as a guide for students and practitioners preparing to take state or national board examinations.—*William F. Via, Jr.*

■ ORAL PHYSIOLOGY. By Sidney I. Silverman. 533 pages. $15. St. Louis, C. V. Mosby Co., 1961.

Since care of the clinical patient is concerned essentially with the prevention and treatment of disturbances in normal physiology, a thorough knowledge of physiological principles is essential for optimal total patient care.

Recent years have witnessed a rapid advancement in fundamental biological knowl-

edge and these advances have created new responsibilities in dental research, education and practice. In this book an attempt has been made to correlate fundamental physiological principles with clinical problems. Its aim is to serve as a bridge between the dentist's education in the basic sciences and his clinical practice.

The postgraduate student may use the text as a reference and apply it to his special field of interest.

Especially interesting are the chapters dealing with the application of the principles of tissue activity to the clinical needs of childhood (problems of growth and development), adulthood (periodontal problems) and old age (prosthodontic problems). The author has had many years of teaching and clinical experience and with this volume has answered an urgent need to correlate the findings of scientists and clinicians for a more effective over-all understanding of physiological principles in health and disease.

The book is amply supplied with excellent photographs and illustrations and is highly recommended to both student and practitioner. —*David L. Ford.*

■ Noyes' Oral Histology and Embryology. By Isaac Schour. Eighth edition. 440 pages with 345 illustrations, 12 in color. Index. $11.50. Philadelphia, Lea & Febiger, 1960.

This new edition of a well known American textbook is an improvement over the previous edition (1953). Doctor Schour has added the indelible imprint of his meticulous care and sound judgment. In his preface the author acknowledges the advice and consultative help of a number of authorities, who, in a variety of special fields, have served to make the text authentic. The mere fact that this book is now appearing in its eighth edition attests to its value, and to the great interest which the field elicits.

In the preparation of this edition, the original plan of Dr. Frederick B. Noyes, now retired, to keep the book a simple and straight forward statement of current conceptions of the structure and functions of the tissues has been followed.

The text covers a rapidly expanding field, and has been improved through revision without being unduly lengthened. Some important changes have been made. Three color plates and 40 new figures and illustrations were added to replace old illustrations and to demonstrate new findings. Six tables were prepared to increase the clarity of the text. Another innovation is the addition of chapters on the histology of the temporomandibular joint and experimental dental histology. These new chapters contain the bulk of what the student needs to know in these areas. In addition to the excellent illustrations and list of up-to-date references that follow each chapter, the book is well indexed. All these features constitute a valuable contribution to this work. This new edition earns high praise. It sets forth the broad outlines of current oral histological and embryological knowledge.

This book can be recommended to dental and medical students, and graduate students in the various biological sciences as an excellent textbook and reference work on oral histology and embryology. In fact anyone interested in these subjects should possess a copy. For the student just being introduced to these subjects an up-to-date readable text is a real boon.

The format, printing and illustrations in this book are excellent. The book is worthy of the fine tradition of the publishers.—*E. Alan Lieban.*

■ General Anesthesia for Dentistry. By James McNaught Inglis and Victor Campkin. 88 pages. $3. Baltimore, Williams & Wilkins Co., 1960.

The brevity of this volume on dental anesthesia is rather refreshing, although as a reference text it is far from adequate.

The main theme is anesthesia without anoxia. Balanced anesthesia is discussed. There are, in addition, short discussions on physiology, anesthetic agents, technics and complications.

While reading the book, one feels that he

is being given a cursory tour through the science of anesthesia but never actually sets his feet firmly on the ground. The book has merit as a general discussion or outline of general anesthesia for the uninitiated, or the undergraduate student; however, it has relatively little to offer otherwise. From their introduction, it would appear that the authors are well aware of this volume's shortcomings.—*Paul H. Mathews.*

■ GENERAL ANESTHESIA FOR DENTAL SURGERY. By R. S. Walsh. 94 pages with 19 illustrations. Index. $4.25. New York, Longmans, Green & Co., 1960.

This book, originating in England but definitely oriented to this country, is a concise, practical book intended primarily for the student and the practitioner of general anesthesia in dental practice both for outpatients and in hospital practice.

It contains nothing really new but it is simply, neatly and concisely written, enabling the student to glean a great deal of information in a relatively short time. It is obvious that the author spent much time eliminating large amounts of chaff so he would be able to give the student the essence of his views concerning matters relative to the question of general anesthesia in dentistry. It is logically organized, starting with background factors such as pharmacology and equipment as well as physiology, and proceeding into the question of various technics, resistant patients, children, assessment and management of emergencies, and other technics.

Because of the fact that this is a British textbook, there are, naturally, different names for similar items, and different equipment is used than that used in the United States. There is a slightly different attitude on a few minor points. However, the over-all evaluation of this textbook is that the author has presented a good, concise evaluation of general dental anesthesia. He is to be congratulated for side-stepping the issue of intravenous barbiturates which implies that it plays no major part in his armamentarium.

This book can be recommended for medical and dental school libraries and for hospital libraries; however, it should not play a primary role, as a more complete reference-type textbook would be recommended for the major institutions. This one should play a secondary role because of its conciseness and thoroughness, and the basic soundness in Dr. Walsh's approach to general anesthesia for dentistry.—*Max S. Sadove.*

■ MORPHOGENETICAL ASPECTS OF THE HUMAN UPPER MOLAR: A COMPARATIVE STUDY OF ITS ENAMEL AND DENTINE SURFACES AND THEIR RELATIONSHIP TO THE CROWN PATTERN OF FOSSIL AND RECENT PRIMATES. By Cornelis A. W. Korenhof. 368 pages. 15 plates. Bibliography and Index. 60 figures. 34 tables. Uitgeversmaatschappij Neerlandia – Utrecht, 1960.

A particularly unique collection of teeth in which the crowns consist solely of enamel with the dentin and root structure missing is the basis for an excellent work by Dr. Korenhof of Utrecht dealing with the morphogenetical aspects of the human upper molars. Proteolytic and other destructive actions on the dentin left these teeth with the inner surface of the enamel exactly representing the outer form of the formerly underlying dentin, the original position of the ameloblast-odontoblast apposition as the teeth began to form in the early phases. The present reviewer had the opportunity of inspecting these teeth on a recent trip to Holland and found this most unusual assemblage of teeth to be extremely fascinating and the subject material of Dr. Korenhof's work. Dr. Korenhof made endocasts from each of these enamel caps which, when completed, represented the form of the dentin body. A detailed comparison of the topography of the outer enamel cap and the corresponding points on the surface of the dentin on the endocasts was then made.

In the course of the study the author found it necessary to refer to other primate dentitions for understanding of certain discrete eminences and markings that were to be found on the endocasts. This he has included in the text of his publication and has resulted in

doubling the value of the work in this comparative study.

His work reaches into various aspects of the theories of dentition. For example, his findings relating to certain prominences of the buccal surface of premolars and molars is "at variance with Bolk's theory on the genesis of this feature (his tuberculum paramolare)."

"The occurrence of fifth molars," he says, "although only known in Pongidae, adds strength to the contention that distomolars can only be supernumerary developments of the dental lamina, and that they do not represent third molars which have been lost in the Catarrhina." He goes on to say that cusps occurring on the buccal surfaces of M^1 have not the slightest phylogenetical significance. This concurs with thinking of workers in this country as well who believe that such cusps have origins in the cingulum.

He also cautions that a very real danger exists in obtaining a possible result in studies that reflect rules rather than what might be represented.

The work of Korenhof is highly technical in many phases, but illustrates the intricacies and importance of many of the details in the evolutionary advances of dentition to the modern forms.—*Albert A. Dahlberg.*

■ THE PHARMACOLOGY OF ANESTHETIC DRUGS. By John Adriani. Fourth edition. 248 pages. Profusely illustrated. Index. $11. Springfield, Ill., Charles C Thomas, 1960.

The format and page size for this edition is the same as for the third edition. Line drawings are used extensively to illustrate clearly the actions of the most important or typical drugs. Data concerning many more drugs are given in tables. The over-all design makes it easy for the reader to find the information he needs.

The material is organized in 15 sections, plus glossary, references, and index. Seven of the sections, including those on tranquilizers, narcotics and local anesthetics, have been expanded significantly. As a result, the text is 49 pages longer than that of the preceding edition.

The book could be improved by revision of its drug and chemical terminology. For example, the distinction between trade marks and generic names is not always adequate, and it is not always clear whether the chemical and physical properties referred to in the tables are those of the basic or acidic drug, or of its soluble salts.

As in earlier editions, binding, typography and paper are excellent. This book should be useful to general practitioners, as well as to anesthesiologists.—*Donald A. Wallace.*

■ CLEFT LIP AND PALATE REHABILITATION. By William H. Olin. 194 pages with 276 illustrations. Index. $9. Springfield, Ill. Charles C Thomas, 1960.

The seven chapters of this short, profusely illustrated monograph have been written to answer the many inquiries received by the author regarding treatment of cleft lip and palate patients. Although the orientation is primarily toward the dentist (the author is an orthodontist), the subject matter will be of interest to physicians, speech therapists and members of allied professions. The first chapter briefly discusses the frequency of congenital clefts, embryogenesis, etiology and classification. The listing of cleft palate teams, while not completely accurate, will prove of value to those desiring a team consultation.

Chapter II on feeding is important, but the two pages of text are inadequate.

Chapter III describes surgical technics and provides good information on lip and palate closure.

The important problem of general dental care is discussed in Chapter IV. Like Chapter II, however, this section does little more than emphasize the nature of the problem.

Chapter V by Spriestersbach provides an excellent, basic discussion of the speech mechanism. The stylized cephalometric tracings of velopharyngeal valving are not completely in accord with recent research on this problem at other cleft palate centers.

Chapter VI on orthodontics is well written and illustrated and provides the most complete

handling of the subject in the book. Other orthodontists who have had considerable experience with expansion as a method of orthodontic therapy will question the optimism expressed by the author in holding the degree of expansion he has achieved.

The final chapter discusses the problem of cleft palate prostheses and presents a number of case reports demonstrating the technics employed.

Type size is good and easy to read; the binding is sturdy and attractive. If the reader is not too concerned over a number of typographical errors and the fuzziness and lack of contrast in a few of the intraoral and roentgenogram reproductions, and the listing of secondary references in some instances, the book should prove a worthwhile addition to his library.—*T. M. Graber.*

■ PHARMACOLOGY AND THERAPEUTICS. By Arthur Grollman. Fourth edition. 1,079 pages. Illustrated. $12.50. Philadelphia, Lea & Febiger, 1960.

The third edition of "Grollman's" was published two years ago. A new fourth edition, published recently, includes much new material, numerous corrections and improvements in presentation. New sections on corticosteroid therapy, treatment of cancer, present-day use and understanding of tranquilizers, and the newer hormones and psychic energizers have been added. Drugs introduced in the past 24 months are included.

This is an excellent book and invaluable to the practitioner of dental surgery. The modern dental surgeon is constantly deluged with new material on drugs and uses them in his practice. Dr. Grollman is both an M.D. and a pharmacologist in Southwestern Medical College of Dallas, Texas. He has seen and tested the reaction of many drugs on his own and referred patients. He stresses toxicology and presents a scientific guide to the correct use of drugs, their dosage, methods of administration and effect on the body. The dentist, who wishes to keep abreast of modern therapeutics, should include this book in his library. It is an extremely useful text and reference book for a dental student.

In addition to the subject matter, the author gives a critical evaluation of advertising claims to which the dentist and physician are subjected. This is a rather unique approach and is one that is highly desirable.—*E. R. Cox.*

■ SYNOPSIS OF ORAL PATHOLOGY. By S. N. Bhaskar. 502 pages. $9.75. St. Louis, C. V. Mosby Co., 1961.

Synopsis of Oral Pathology presents a sifted and condensed form of the present knowledge of oral pathology in a quick reference text. Basically, it is divided into two parts. Part One consists of a tabulated, cross-indexed classification of diseases based on clinical symptoms, and, in Dr. Bhaskar's words, "Part II represents a distillation of what is known about oral pathology." The text is well written in a clear, concise manner. The numerous photographs and photomicrographs are clear and representative.

The *Synopsis of Oral Pathology* is not intended as a basic textbook but rather as a useful supplement to the standard texts that are currently available. The book is well suited for this specialized purpose and should find wide acceptance by undergraduate and graduate students as well as by dentists and oral pathologists in active practice.—*Paul H. Mathews.*

■ Geriatric Patients with Head and Neck Problems. Oliver H. Beahrs, M.D., Am. J. Surg. 100:813 Dec. 1960.

Lesions of the head and neck occur in patients of all ages; however, the types of lesions vary from one age group to the other. All ulcerations or swellings of the neck are potentially dangerous to the patient unless proved otherwise. Whenever an abnormality is noted in the region of the head and neck, oral and extensive examination of the region is extremely important. A careful history should be obtained and evaluated. Both sides of the neck should always be examined because a lesion could sometimes be identified only by asymmetry. Every examination, especially when a tumor is present in the neck, should include careful inspection of the lips, all parts of the mouth and pharynx, and indirect laryngoscopic inspection of the larynx. The fact that the tumor in the neck may be the result of generalized disease or be secondary to tumors below the level of the clavicle must be kept in mind.

The examination establishes the general condition of the patient and his physiologic age which is of greater importance than his chronologic age. Advanced chronologic age alone should not be a deterrent to advising radical surgery.

Radical surgical procedures are necessary for some malignant diseases of the head and neck. Even though these procedures are extensive, they carry a low mortality rate.

Inadequate or conservative surgical treatment is largely responsible for the high rate of recurrence and the low rate of survival among patients with these lesions. As long as the defect is compatible with essentially normal living, definitive surgery should always be performed if possible. If a lesion is inoperable, radiation therapy may be of value.

It becomes the responsibility of the surgeon to discuss with the patient and relatives the probable diagnosis, the surgical procedure, and the results that may be expected.

Any preoperative supportive therapy or treatment of coexisting disease that is indicated should be given. Dehydration and anemia may occasionally be present in the older patient because of carcinoma of the mouth.

A tracheotomy assures an adequate airway during the period of edema and permits easy aspiration of secretions during the immediate postoperative period. Early ambulation is encouraged for older patients. If an intraoral procedure has been performed, feeding is accomplished through an indwelling intranasal gastric tube. Otherwise, oral intake is started the day after operation.

Benign lesions are occasionally seen in older patients. Tumors of the parotid gland are seen in the preauricular and infra-auricular regions. Approximately 30 per cent of the patients having these lesions are past 60 years of age.

The most common malignant tumor is the mixed tumor that has undergone malignant transformation. Other malignant parotid tumors include cylindromas, mucoepidermoid carcinomas, adenocarcinomas, and metastatic lesions of the parotid lymph node. Benign parotid tumors are best treated by parotidectomy, with preservation of the facial nerve. Subtotal parotidectomy is performed when the lesion is in the portion of the gland superficial to the facial nerve and total parotidectomy is used when the lesion is in the portion of the gland deep to the nerve.

Results of treatment of carcinoma of the head and neck are good. Earlier treatment and more adequate surgical procedures should improve these results in the future.—*Burt S. Abramson.*

■ CONTROL OF BLEEDING AFTER DENTAL EXTRACTION DURING ANTICOAGULANT THERAPY. H. J. Roberts. J.A.M.A. 175:962 March 18, 1961.

The prevention and management of bleeding after dental surgery in patients on long-term anticoagulant therapy still leaves much to be desired. Temporary cessation of the anticoagulant and the administration of a small dose of some vitamin K preparation, either orally or parenterally, might not be adequate for prompt control of bleeding. On the other hand, the administration of this antidote in large doses may abolish the proved prophylactic value of anticoagulants or render subsequent regulation of anticoagulant therapy difficult. Furthermore, one hesitates to discontinue drugs of the coumarin series suddenly in light of the restoration of the original risk of thrombosis and the high incidence of "rebound" thromboembolism that occurs in the second to sixth week thereafter. The procedure the author follows consists in omitting the anticoagulant (bishydroxycoumarin, phenprocoumon, or warfarin sodium) for three or five days preceding surgery. Conjugated estrogenic substances were injected intravenously a half hour prior to extraction. No vitamin K or K_1 preparation was employed prophylactically. The extractions were performed by several oral surgeons using standard technics, due attention being directed to hemostasis. An additional dose of conjugated estrogenic substances was given in from 8 to 12 hours in those patients who had been hospitalized for extensive extractions or who subsequently evidenced significant local oozing. The oral administration of the anticoagulant was resumed the day after dental surgery. An attempt was made not to exceed prothrombin time greater than 30 seconds while on an outpatient basis. The pharmacological basis for the beneficial effect of estrogens in the prevention and control of bleeding merits brief review. Conjugated estrogens exert an influence on the blood clotting mechanism, but more significantly on the capillary bed. The rapid increase in concentration of estrogens after intravenous injection is probably an important factor in promoting coagulation of the blood. Conjugated equine estrogen injected intravenously produced little or no change in thrombocyte counts of the peripheral blood either in patients having normal platelet counts or those with thrombocytopenia.

The inhibition of fibrinolytic activity by estrogen is reflected in the rise of blood fibrinogin levels. Other hemostatic mechanisms with estrogen therapy that have been advanced include serotonin-like activity and the neutralization of a vascular toxin. Several recent reports indicate that estrogen administration can influence adrenocortical steroid metabolism. There was a decrease in the capillary permeability and a reduction in the prolonged bleeding time caused by cortisone and corticotropane inserted in a hemorrhagic state, most notably "pseudohemophilia." Furthermore, the corticosteroids may induce hypercoagulability of the blood as a result of thrombocytosis and a decreased plasma fibrin with activity.—*Burt S. Abramson.*

■ MOUTH TO NOSE RESUSCITATION DURING CONVULSIVE SEIZURES. James Elam, Arne Ruben, David Greene and Theodore Bittner. J.A.M.A. 176:565 May 20, 1961.

Severe seizures occurring during electroconvulsive therapy challenged any method of respiratory resuscitation. In 12 adults undergoing this treatment, mouth to nose breathing was consistently successful in preventing cyanosis. Higher than customary pressures were needed, and sometimes they had to be maintained long enough to overcome intermittent closure of the glottis, but the technic was easy to learn.

According to the experience gained in this series, the technic of inflating the convulsing patient consisted of three essential points: (1) hyperextension of the head must be established and maintained; (2) after maximal inspiration, the rescuer must secure a seal around the victim's nose that will remain airtight as he applies maximal pressure; (3) the rescuer holds the inflating pressure as air is delivered intermittently between glottic spasms until he senses that he has emptied a large tidal volume from his own lungs. He then releases contact to allow the patient to exhale

while he, the rescuer, takes his next breath.

Transient cyanosis, which generally appears during electroconvulsive therapy, was prevented by mouth to nose breathing.—*Irwin A. Small.*

■ Infantile Reaction to Facial Disfigurement. Beatrice Kresky and Bernard E. Simon. Arch. Surg. 83:165 May 1961.

It is frequently stated that a surgical procedure in a child under three years old is a traumatic experience and that elective surgery is best postponed until the child is at least five years of age. Separation and anxiety and activation of unconscious fantasies about mutilation, castration and death may traumatize the infantile ego permanently. The authors are not in agreement with this concept and feel that the trauma children experience in a hospital environment is due to separation and anxiety alone. It usually can be controlled by handling the child in a reassuring fashion and by the mother's presence during the hospital stay.

A child under five may suffer from a disfiguring congenital defect. He feels anxiety in all interpersonal relationships although he usually lacks the ability to verbalize his fears. This may be responsible for more serious damage to the child's ego than is caused by a series of surgical procedures. Repair of congenital defects should be done as early as is compatible with the infant's physical ability to undergo surgery.

A child was seen who from 14 months of age on, because of facial disfigurement, clearly manifested anxiety, sorrow, and a sense of nonbelonging. His reactions to the deformity took the following forms: (1) psychosomatic symptoms: intractable colic with vomiting, constipation, and diarrhea; (2) animal identification and confusions as to his role in human society; (3) feelings of withdrawal and isolation.

It must be assumed that the majority of infants with cosmetic defects suffer anxiety similar to that of this patient, although they lack the ability to express their feelings. Pediatricians and surgeons should advocate correction of disfigurement at the earliest age medically feasible.—*Donald Rae.*

■ Hypertrophied Frenuli, Oligophrenia, and Familial Trembling and Anomalies of the Hand. Robert J. Gorlin, V. Elving Anderson, and C. Ronald Scott. New England J. Med. 264:486 March 9, 1961.

This symptom complex has been described as affecting only females and inherited as an incomplete recessive gene. It consisted of abnormally developed frenuli, that by extension, cleft the jaws, and the tongue. These clefts were situated in the lateral incisor-cuspid regions. Malposition of maxillary cuspid teeth, frequent infraocclusion and absence of mandibular lateral incisors were commonly observed. Frequently associated with these oral anomalies were the following: hypoplasia of the base of the skull and extension of the cranial vault, with increased interorbital distance; median cleft of the upper lip; cleft palate; aplasia of the alar nasal cartilages; malformation of digits, frequently syndactyly, or trident hand; familial trembling; mental retardation, and granular skin appearance.

The authors had occasion to observe a family in which this disorder affected four female members.

The contention that the syndrome is manifested as an incomplete recessive trait is certainly not borne out in this family. The occurrence of the symptom complex in the grandmother, mother, and two granddaughters clearly establishes this as a dominant characteristic. The ostensible limitation of the syndrome to the female sex raises some interesting questions. There appear to be at least four alternatives to explain this syndrome:

Inadequate information or sampling—more careful interviewing would show affected males. Inadequate diagnosis—examination of all children of affected females would show some males with mild defects.

Dominant sex-limited anomaly—this implies some effect (possibly hormonal) on expression, half the male sibs carrying the gene

and transmitting it to half their daughters (who would thus be affected).

Lethal effect on the male—when the gene for the syndrome appears in the male, this coupling is incompatible with life. Such a condition would reveal a two to one female-to-male ratio in a relatively large family.

Cleft tongue, by itself, is a rare anomaly, only a few cases having been reported. Cleft tongue may also be associated with a median cleft of the lower jaw and lip, but these cases have never been associated with the other signs noted in the syndrome.—*Burt S. Abramson.*

■ NEWER CONCEPTS IN SURGICAL CORRECTION OF MANDIBULAR PROGNATHISM. Nicholas Georgiade and Galen Quinn. Plast. & Reconstr. Surg. 27:185 Feb. 1961.

In the correction of mandibular prognathism the surgeon should strive not only for cosmetic improvement but for improvement in occlusal relationship of the dentition and relief of any temporomandibular joint difficulties which may arise from the malocclusion. The presurgical treatment and work-up should include cephalometric roentgenograms, a set of oriented study models mounted on a Hanau articulator, an accurate wax bite, and an acrylic bite which can be used during surgery to reposition the mandible.

A surgical exposure is the standard submandibular incision below the mandibular angle with dissection to expose the complete lateral border of the ascending ramus to the coronoid notch. A needle is inserted externally through the coronoid notch in order to serve as a guide plane for the mandibular saw. Sectioning of the mandible is facilitated by use of a long nasal retractor so that direct vision of the entire ramus of the mandible can be maintained during the osteotomy. Sectioning is easily performed by means of a specially designed mandibular saw. The cut is made on a bevel in the ramus from the coronoid notch to the angle in order to allow greater eventual contact area when repositioning the distal fragment. After mandibular sectioning, a better fit and a more rapid healing of the cut fragments are obtained by removal of a portion of the cortical bone in the region in which the distal and the condylar fragments over-ride the anterior ramus portion. The mandible is then immobilized with intermaxillary 25 gauge ligatures for about six weeks.—*Irwin A. Small.*

■ CHRONIC SIALOADENITIS CAUSED BY AUTOIMMUNIZATION. Johannes Mosbech and H. P. Østergaard Kristensen. Acta Medica Scandinav. 168:147 fasc. 2, 1961.

The authors recently have had the opportunity to observe a patient with chronic sialoadenitis with serological evidence of autoimmunization.

Circulating autoantibodies in high titers have been demonstrated previously in Hashimoto's goiter and in Sjögren's syndrome. This is the first occasion on which circulating autoantibodies have been demonstrated in the patient with sialoadenitis. The mechanism of such antibody formation is not clear but it is assumed that release from the glands of an antigenic substance, or leakage from the glandular epithelium, is followed by the infiltration of the tissue by lymphocytes, and particularly plasma cells, giving rise to antibody formation and an antigen-antibody reaction in the gland with destruction of tissue.

The patient had transient eye symptoms and slight arthralgia, but there was no definite evidence of keratoconjunctivitis and no objective signs of rheumatoid arthritis; thus the diagnosis is not compatible with Sjögren's syndrome. Only the submaxillary gland was involved in the pathological process. The high antibody titers to extracts of parotid and submaxillary gland encountered in the patient are thus very probably of pathogenic significance for the clinical picture. The chronic sialoadenitis may be readily explained as a phenomenon analogous to the chronic thyroiditis of Hashimoto's type where there is considerable evidence that autoimmunization occurs.

In a female suffering from chronic submaxillary sialoadenitis, pathological serum protein values with greatly raised gamma globulin levels were encountered.—*Burt S. Abramson.*

Announcements

■ Oral Surgery Sessions Set for American Dental Association Meeting

Two sessions on oral surgery, co-sponsored by the American Dental Association and the American Heart Association, will be held during the 102nd annual meeting of the dental association in Philadelphia, October 16-19. Both sessions, scheduled for the morning and afternoon of October 17, will be devoted to the management of dental patients with cardiovascular disease.* Moderators will be Gustav O. Kruger, Washington, D.C., and Francis Chamberlain, San Francisco.

The essay program also will include several other panels: Technic for removal of impacted teeth, October 16, moderator, James R. Hayward, Ann Arbor, Mich.; fractured jaws,* October 18, moderator, Daniel J. Holland, Jr., Brookline, Mass.; roentgenology for the general practitioner,* October 18, moderator, Donald T. Waggener, Lincoln, Neb., and local anesthesia,* October 19, moderator, James R. Cameron, Philadelphia.

Clinical lectures will be presented by Frank A. Strake, St. Louis, on implant dentures, and by Abraham G. Kramer, New York, on repositioning of the mandible. Lectures on oral surgery will be given by Lucian Szmyd, Brooks Air Force Base, Texas; Charles E. Hallum and F. Edward Miller, Birmingham, Ala.; Henry C. Sandler, Brooklyn; Francis J. McDonough, Newburgh, N.Y., and Marvin Maser, Norristown, Pa.

Among the table clinics will be one sponsored by the American Academy of Maxillofacial Prosthetics on treatment of cleft palates. Participants will be Lester E. Rosenthal and Edmund C. Purdy, Bronx, N.Y.; Totten S. Malson, Cleveland; Sebastian A. Bruno and Joseph Luban, New York; Milton J. Miller, Philadelphia, and Hratch A. Abrahamian, Washington, D.C.

The Temple University School of Dentistry, department of radiodontics, will sponsor a table clinic on periapical radiography presented by Richard D. Mumma, Jr., Frank J. Sammartino, and William J. Updegrave, Philadelphia.

Clarence S. Musgrave, Ft. George G. Meade, Md., will present a table clinic on a simple and inexpensive method of doing clinical photography in the office.

Table clinics on complete prosthodontics and implant dentures will be given by Theodore C. Lee, San Francisco; Daniel M. Staub, Belle Harbor, N.Y.; Jack W. Gamble, Richmond, Va.; W. D. Pearson, Chattanooga, Tenn.; Irwin E. Zimmerman, Pittsburgh; A. Norman Cranin, Brooklyn; Joseph S. Frost, Pittsburgh, and Arthur Poster, New York.

Oral surgery table clinics will be presented by Leon D. Fiedler, Ft. Knox, Ky.; H. Glenn Waring, Baltimore; Walter H. Fox, Washington, D.C.; Theodore Lite, Brooklyn; Jack E. Brenner, Brooklyn; Kenneth L. Dedekind, Salt Lake City; Eugene R. Grandel and Nicholas G. Grand, Chicago; Donald R. Kennedy, San Francisco; I. Norton Brotman and Don N. Brotman, Baltimore; Harold A. Meyers, Far Rockaway, N.Y.; Marvin Sniderman, Pittsburgh; and S. Berton Gerstner, New York.

The items marked with an asterisk have been approved for retirement point credit for Armed Forces reserve officers.

■ Periodontology Academy to Hold Meeting During Bermuda Cruise

The American Academy of Periodontology will hold its forty-seventh annual meeting on board the *M. S. Bergensfjord,* sailing from Philadelphia October 20 to Bermuda and returning October 25.

A comprehensive program will be presented relating to new advances in periodontal research and treatment. The ship will serve as the participants' hotel while in Bermuda.

Further information may be obtained from Mr. E. M. Baskette, Caribbean Cruise Lines, Suite 301, Roeper Bldg., Miami 32, Fla.

■ Role of Suggestion in Audio Analgesia to be Discussed

The American Association of Audio Analgesia will present a program on the role of suggestion in audio analgesia, October 9, at 8 P.M. in the New York Academy of Sciences. Lecturer will be Aaron A. Moss, and discussant will be Jerome S. Mittelman. Further information on the meeting and on the organization may be obtained from the president, Jerome S. Mittelman, 30 E. 60 St., New York 22.

■ Implant Denture Academy to Hold October Seminar

The American Academy of Implant Dentures will hold its third annual international seminar on implants in dentistry, October 13-15 at the University of Pennsylvania School of Dentistry in Philadelphia.

A review of the field of implant dentures will be presented and lecturers will discuss case selection, technics, contraindications, and follow-up. One day will be devoted to constructing and inserting an implant denture on a patient. Closed-circuit television facilities will be utilized for this purpose.

The registration fee is $50 and enrollment is limited to 40 doctors. Application forms and information may be obtained from A. Norman Cranin, chairman, American Academy of Implant Dentures, 2120 Ocean Ave., Brooklyn 29, N.Y.

■ Total Care of Cancer Patient Topic of Society Meeting

The physician and the total care of the cancer patient will be the topic of the 1961 scientific session of the American Cancer Society, October 23-24 in New York City. Areas for discussion will include: Decisions in the early care of the cancer patient, counseling the cancer patient, what the cancer patient should be told, care of the advanced cancer patient and society's role in caring for the cancer patient. Among the cancer sites to be studied will be the head and neck.

Further information may be obtained from Professional Education Section, American Cancer Society, 521 W. 57 St., New York 19.

■ National Conference of Hospital Dental Chiefs Formed

The Metropolitan Conference of Hospital Dental Chiefs declared itself a National Conference as of March 14, 1961. The first organizational meeting of the National Conference will be held during the annual meeting of the American Dental Association, October 1961, in Philadelphia. Further information may be obtained from Paul Scheman, 134 W. 58 St., New York 19.

■ Dental Anesthesiology Society to Meet in October

The American Dental Society of Anesthesiology will hold its annual meeting at the Statler-Hilton Hotel in New York City, October 13-15. Scientific session, social events, and a house of delegates meeting has been planned. Further information may be obtained from J. D. Whisenand, 319 Bloomington St., Iowa City, Iowa.

■ Conference on Graduate Education in Oral Surgery Set for November

The American Society of Oral Surgeons will conduct its fourth conference on Graduate Education in Oral Surgery, November 27, at the headquarters of the American Hospital Association, Chicago. In conjunction with this meeting the advanced institute on hospital dental service conducted by the Council on Hospital Dental Service of the American Dental Association, and the American Hospital Association will be held November 28 to 30, also at the hospital association's headquarters.

■ Maxillofacial Prosthetics Academy to Hold Philadelphia Meeting

The American Academy of Maxillofacial Prosthetics will hold its tenth annual meeting at the Benjamin Franklin Hotel, Philadelphia, October 11-13. The general business meeting and the professional program will begin Thursday morning, the 12th. Further information may be obtained from Mervin C. Cleaver, executive secretary, 2330 Linwood Ave., Apt. 3H, Coytesville-Fort Lee, N.J.

■ Institute on Hospital Dental Service Planned for November

The American Dental Association and the American Hospital Association will conduct an advanced institute on hospital dental service, November 28-30, at the latter's headquarters in Chicago. Registration fee is $45. Topics to be discussed include expansion of the established dental service, development of hospital dentistry for the general dentist, the dental service as a diagnostic service to the hospital and the extension of hospital dental service to special patients. Economic factors to be considered in the operation of a dental service will be the subject of a panel discussion.

■ Oral Pathology Program Offered at University of Oregon

A graduate program in oral pathology is being offered at the University of Oregon Dental School. It is a three-year program, the first year of which consists of resident-type training in general pathology at the University of Oregon Medical School. The following two years are taken under the direction of Norman H. Rickles and Robert J. Bruckner at the Dental School. A special research activity leading to a thesis completes the requirements for the Master of Science degree in oral pathology. Financial support is available through the Teacher-Training Program of the U.S. Public Health Service, and a stipend will vary from $4,000 to $5,000 per year depending on individual circumstances. Inquiries should be addressed to Ellis B. Jump, chairman, Graduate Committee, University of Oregon Dental School, 611 S.W. Campus Drive, Portland 1.

■ Periodontics Course at Albert Einstein College of Medicine

The Department of Dentistry of the Albert Einstein College of Medicine, Yeshiva University, is offering a postgraduate course in periodontics. The course is under the direction of Irving Yudkoff, Marvin N. Okun and associates, and will be held October 30 to November 3. Tuition is $175. Further information and application blanks may be obtained from the director, Postgraduate Dental Program, Albert Einstein College of Medicine, Yeshiva University, Eastchester Rd. and Morris Park Ave., Bronx 61, N.Y.

■ Research and Teaching Traineeships at University of Pennsylvania

Research and teaching traineeships in the basic sciences, in periodontology and in the comprehensive treatment and rehabilitation of the cleft palate patient are available at the School of Dentistry, University of Pennsylvania. All traineeships are supported by the U.S. Public Health Service. Annual stipends vary from $4,500 and up depending on the qualifications and needs of the successful candidates.

Inquiries for the basic science and cleft palate traineeships should be sent to the chairman, Committee on Traineeships and Fellowships, University of Pennsylvania, School of Dentistry, 4001 Spruce St., Philadelphia 4. Inquiries for traineeships in periodontology should be sent to the dean, Graduate School of Medicine, 237 Medical Laboratories, University of Pennsylvania, Philadelphia 4.

■ Oral Surgery and Hospital Management Courses at Ohio State

Postgraduate courses in oral surgery and hospital management for dental procedures will be available at Ohio State University. The oral surgery course will be given by Morgan L. Allison, November 27-29, 1961, and again May 7-9, 1962. The fee is $75. The hospital management course will be given by Morgan L. Allison and Bernard S. Snyder, January 22-24, 1962. The fee is $100. Further information may be obtained from the College of Dentistry, Postgraduate Division, Ohio State University, Columbus 10.

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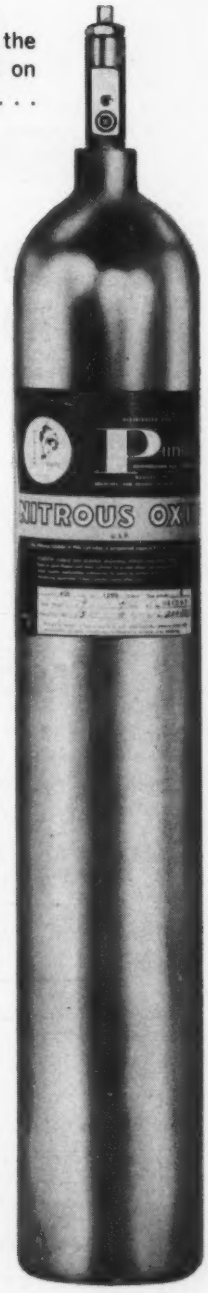

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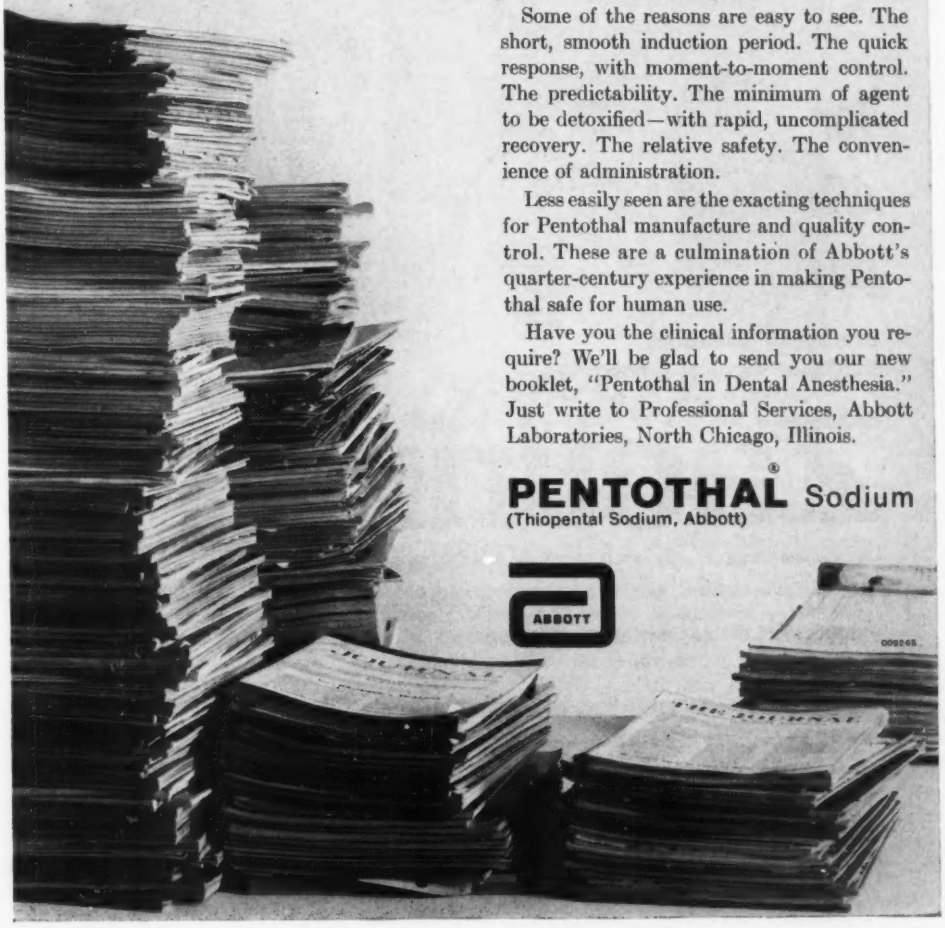

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